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JANUARY 1934

Journal of Educational Research

Registered June 4 1929

CONTENTS

		PAGE
Recent Social Changes and Educational Research	*Malcolm M. Willey*	321
How Students Study for Three Types of Objective Tests	*Paul W. Terry*	333
Technical Vocabularies for Plane and Solid Geometry	*Elizabeth B. Cowley*	344
Intelligence and Spanish Homes as Factors in Spanish Achievement on the Canal Zone	*Everett B. Sackett*	355
Editorial—Research and the Professional Education of Teachers	*A. S. Barr*	364
Reviews		367
Research Abstracts and Bibliographies		373
Doctors' Theses Under Way in Education, 1933-1934	*Carter V. Good*	380

THE JOURNAL OF EDUCATIONAL RESEARCH is indexed in the Education Index

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JOURNAL OF EDUCATIONAL RESEARCH

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THE JOURNAL OF EDUCATIONAL RESEARCH is published at Bloomington, Illinois monthly, except June, July, and August by the Public School Publishing Company. The subscription price is $3.50; $3.50 in Canada or Mexico; and $3.50 in other foreign countries.

Subscriptions and all communications about reprints or other business matters should be addressed to the PUBLIC SCHOOL PUBLISHING COMPANY, at Bloomington, Illinois.

Address all communications on editorial matters to A. S. Barr, Department of Education University of Wisconsin, Madison, Wisconsin.

JOURNAL *of* EDUCATIONAL RESEARCH

Volume XXVII JANUARY 1934 Number 5

RECENT SOCIAL CHANGES AND EDUCATIONAL RESEARCH

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University of Minnesota

IN the fall of 1929, the President of the United States appointed a committee of social scientists "to examine and report upon recent social trends in the United States with a view to providing such a review as might supply a basis for the formulation of large national policies looking to the next phase in the nation's development." The members were Wesley C. Mitchell, chairman, Charles E. Merriam, vice chairman, Shelby M. Harrison, Alice Hamilton, Howard Odum and William F. Ogburn. Professor Ogburn was made director of research, and Professor Odum, assistant. After three years of work the Committee made its report on January 2, 1933, and its own findings, with the 29 special reports upon which they were based, were published in two volumes of nearly 1600 pages.[1] In addition, the Committee is issuing twelve supplementary volumes which will present in greater detail the material in selected fields.

The result is a comprehensive picture of American social life from the outset of the century to date. The nature of the report precluded speculation (except where definitely earmarked) and obligated the researchers to deal with concrete data. If there are shortcomings because of this requirement, they are far outweighed by the gain from having so overwhelming a mass of factual material organized and made available in two volumes. These are the fields covered:[2]

*The Population of the Nation (Warren S. Thompson and P. K. Whelpton, Scripps Foundation for Research, Miami University).

The Utilization of Natural Wealth (Mineral and Power Resources: F. G. Tryon and Margaret Schoenfeld, Brookings Institution; Agricultural and Forest Land: O. E. Baker, Bureau of Agricultural Economics)..

[1] *Recent Social Trends in the United States.* Report of the President's Research Committee on Social Trends. With a foreword by Herbert Hoover. Two volumes (New York: McGraw-Hill Book Company, 1933), xcv + 1568 pp.

[2] Supplementary monographs, by the same authors, have appeared in the fields designated by an asterisk. Half of these have already appeared. They are being published by McGraw-Hill Book Co.

The Influence of Invention and Discovery (W. F. Ogburn, University of Chicago, assisted by S. C. Gilfillan).

*The Agencies of Communication (Malcolm M. Willey, University of Minnesota, and Stuart A. Rice, University of Pennsylvania).

Trends in Economic Organization (Edwin F. Gay, Harvard University, and Leo Wolman, Columbia University).

Shifting Occupational Patterns (Ralph G. Hurlin, Russell Sage Foundation, and Meredith Givens, Social Science Research Council).

*Education (Charles H. Judd, University of Chicago).

Changing Social Attitudes and Interests (Hornell Hart, Bryn Mawr College).

*The Rise of Metropolitan Communities (R. D. McKenzie, University of Michigan).

*Rural Life (J. H. Kolb, University of Wisconsin, and Edmund deS. Brunner, Institute of Social and Religious Research).

*The Status of Racial and Ethnic Groups (T. J. Woofter, Jr., University of North Carolina).

*The Vitality of the American People (Edgar Sydenstricker, Millbank Memorial Fund).

The Family and Its Functions (W. F. Ogburn, University of Chicago, assisted by Clark Tibbetts).

*The Activities of Women Outside the Home (S. P. Breckinridge, University of Chicago).

Childhood and Youth (Lawrence K. Frank, General Education Board).

The People as Consumers (Robert S. Lynd, Columbia University, assisted by Alice C. Hanson).

*Recreation and Leisure Times Activities (J. F. Steiner, University of Washington).

*The Arts in Social Life (Frederick P. Keppel, Carnegie Corporation).

Changes in Religious Organizations (C. Luther Fry, Institute of Religious and Social Research).

Health and Medical Practice (Harry H. Moore, Committee on the Costs of Medical Care).

Crime and Punishment (Edwin H. Sutherland, University of Chicago, and C. E. Gehlke, Western Reserve University).

Privately Supported Social Work (Sydnor H. Walker, Rockefeller Foundation).

Public Welfare Activities (Howard W. Odum, University of North Carolina).

*The Growth of Governmental Functions (Carroll H. Wooddy, University of Chicago).

Taxation and Public Finance (Clarence Heer, University of North Carolina).

*Public Administration (Leonard D. White, University of Chicago).

Law and Legal Institutions (Charles E. Clark and William O. Douglas, Yale University).

Government and Society (Charles E. Merriam, University of Chicago).

Three dominating impressions remain after reading the document: first, is an amazing picture of change in every one of the divisions of contemporary life that was studied; second, is the bewildering ramification of these changes and their differential rates of development. In the words of the Committee: "The result has been that astonishing contrasts in organization and disorganization are to be found side by side in American life: splendid technical proficiency in some incredible skyscraper, and monstrous backwardness in some equally incredible slum." Third, is the demonstration of interdependence in modern society and the need for planned coördination of social development. The Committee's statement summarizes the point: "It may be said that the primary value of this report is to be found in the effort to interrelate the disjointed factors and elements. . . . The meaning of the present study is to be found not merely in the analysis of the separate trends . . . but in their interrelation."

The purpose of the present paper is to call attention to the significance for educational research of this report on social trends. Two aspects of educational research are distinguished for convenience, although in practice the problems may shade imperceptibly into each other.

On one side are problems of educational administration. Pertinent data will be found in almost every chapter. The section on taxation, for example, traces expenditures for educational purposes, and interesting implications lie behind the trends that are revealed. Again, the shift of children from country to village schools has produced interesting tensions. The development of the consolidated school in an automobile era, changes in curricula, standards for teacher training, the growth of the junior high school, new practices in school architecture, the playground movement, the function of the private business school, enrollment trends, problems of supervision—all of these, among many others, are discussed and relevant data analyzed in one place or another. In the chapter by Professor Judd devoted specifically to education, three major divisions are found: Curricula and Organization, Teachers and Teaching Problems, and Administration and Control, with a shorter section on Scientific Studies of Education. Throughout there is a wealth of material that the school administrator and the research worker will recognize as important. Since the data are there, no special summary is necessary here.

On the other hand there are data that do not come so directly from the field of education but have educational bearings which cannot be overlooked. They have implications for educational research in a wider

sense than is implied by the term "educational administration." There have been changes in American life and institutions that make it necessary for those interested in education, especially formal education and the school system, to raise fundamental questions of educational practice and theory. It is the intention here to consider some of these data, chosen for illustration. It is hoped that the examples selected will indicate the value of the report in raising questions that must become focuses of educational research if the educator is to be prepared to meet the "next phase" of life into which present trends are taking us.

The Significance of Population Trends.—The phrase "bigger and better" reflects prevailing attitudes in this country that relate to education no less than to other aspects of life. While the question of "betterness" will be waived, the "big-ness" of the American population is intimately associated with education. At the last census the population was approximately 123,000,000, and the increase between 1920 and 1930 was just over 17,000,000. While the population of the United States, however, is still increasing absolutely, the rate of increase has declined. Prior to the Civil War the increase was about 35 percent a decade; since 1910 it has been less than 16 percent. The downward trend is a forerunner of the time when the population will have reached its maximum size, with subsequent stability or decline. Making their estimates on a maximum-minimum basis, Thompson and Whelpton give these figures for the future size of this country:

1940—minimum, 132,500,000; maximum, 134,500,000
1950—minimum, 140,500,000; maximum, 148,500,000
1980—minimum, 145,000,000; maximum, 190,000,000

According to the authors, their minimum estimates are probably more accurate which means that between 1965 and 1970 the population will attain its greatest size (146,000,000) with a subsequent decline.[3] No planning for future educational development can ignore these points, and especially the more detailed discussion of changes, as they occur with reference to size of city, rural-urban classifications, by race and nativity groups and by regions.

It is the population changes in terms of age groupings with which the educational research worker must be most concerned. As a result of falling birth and death rates, the nation is rapidly becoming older; the median age rose from 16.7 years in 1820 to 26.4 years in 1930. Between

[3] All data are drawn from *Recent Social Trends in the United States.* Pp. 1-58.

1920 and 1930 the number of children under five actually decreased, the first time in our history a major age group has shown an actual loss. During the same decade numbers of people from 45 to 64 increased over 25 percent, and those from 65 to 74 over 33 percent. If the present age distribution is imagined as a pyramid, wide at the base and tapering to a point in the upper age groups, it will be seen that continued decline in numbers in the early reaches of life will mean a narrowing base, and eventually the pyramid will become a bee-hive, bulging in the middle.

That the numbers of children under five declined between 1920 and 1930 means that there are now fewer children to enter the school system; already in several American cities there are more seats than children in the lower grades. Thompson and Whelpton estimate that by 1940 or 1945 "there will be a smaller number for each grade up to senior high school." They indicate that by 1940 there will be 1,000,000 fewer children between 9 and 16. It is possible increased attendance standards will for a time actually bring into the schools enough children to counterbalance the decrease in numbers in the general population, but the ultimate prospect of a nation of more older people and fewer younger ones should catch the imagination of the educator.

One can suggest a few questions: How is the probable shift of attention from primary to secondary education, and then, perhaps to college education to be met? Undoubtedly increased expenditures will be needed, for secondary education is more costly in general than elementary education, and college and university education more costly than either. Where are places to be found in the modern world for larger numbers of more highly educated individuals? Will added years of schooling lead to better individual adaptation to life conditions? What kind of education is best suited for the increasing numbers that almost certainly will be found in the next fifty years in the upper school levels?

More intriguing are the questions relating to the increasing proportions of older people. In 1950 nearly 30 percent of the people will be over 45 years of age. Does this not suggest the need for planning for a comprehensive program of adult education that will be effective twenty years from now? The chapter on invention by Ogburn indicates the rapidity with which social habits are being transformed by the machine and scientific invention, and hints at quickly changing industrial processes. Is it to be the function of the school to re-train the older population for adjustment to new techniques? Recently at a leading medical school it was felt necessary to introduce a course in a given sub-

ject for graduating seniors who had taken the basic course in the same field as freshmen; discoveries in the field in the short space of four years had come so quickly that the freshman materials were antiquated. In a sense, all men and women will be confronted with analagous changes in the world about them in the years to come. How is the school preparing itself to meet the future responsibility of keeping "up to date" (in vocational fields as well as cultural) the increasing proportions of men and women in the upper age groups? Does the school hint that adult education in the future may assume the importance in educational systems that has until now been attached to the elementary years? Is it time to prepare for the transfer of interest and support to a new type of educational program adapted to meet conditions a generation from now that are evident in population trends of the present?

The aging process suggests a final point: conservatism is associated with age. Is there any burden upon the schools now and in the future to experiment with pedagogical techniques designed to offset the tendency to resist change? With a mechanical and scientific civilization undergoing rapid modification, by what means are social attitudes to be kept apace? The psychology of conservatism, in the light of present population trends, assumes far more than academic importance.

The Significance of Mass Communication.—The present century has been notable for the development of agencies of mass impression—communication devices for simultaneously reaching large numbers of people, and inducing in them what Professor Giddings termed "like response to like stimulus." The newspaper and periodical press, the motion picture, the radio, along with other less important agencies, make it possible to unite individuals in concerted response. The power of public opinion comes not from the fact that large numbers hold similar beliefs, but that large numbers know and sense that others are holding the same beliefs as themselves. It is the mutual reinforcement of attitudes that infuses public opinion with its dynamic quality. Herein lies the importance of the modern agencies of mass communication. Never before has there existed machinery whereby it was possible with relative ease to impress, and repeatedly impress, the people of an entire nation *from several sources at approximately the same time.*

The data in chapter IV of the Trends report, "The Agencies of Communication,"[4] have educational implications that will challenge the re-

[4] Willey, Malcolm M., and Rice, Stuart A. *Communication Agencies and Social Life.* New York: McGraw-Hill Book Company, 1933. The data used here are from these two sources.

searchers' ingenuity. The growth of the agencies is traced, and increased utilization demonstrated. Discounting depression figures, the last decade has shown wider circulation of newspapers and periodicals, greater attendance at motion picture performances, and larger per capita ownership of radio receiving sets. The integration of these agencies into a communication network, has been accompanied by operation for commercial ends, and concentration of ownership and control in the hands of a relatively small number of powerful groups and individuals. The radio, for example, is exploited in the interest of advertisers, seeking an appeal that will attract large audiences, and the number of stations affiliated with major broadcasting chains has grown rapidly. In 1928 there were 64 stations in the two major chains; in 1932, 168, about one-quarter of all stations. This proportion is more significant when it is remembered that chain stations tend to be those of higher power.

Escape from the influence of this newly evolved and all-pervasive system of mass communication becomes constantly more difficult. The locus of the system is the individual, who is subjected to whatever attitude creating stimuli it brings him. Any consideration of the influence of mass impression must start with recognition of the tremendous vitality possessed by much of the material disseminated, which presumably leads to ready, even though unconscious, acceptance of the attitudes and values involved. It is easy to demonstrate this. It is not without significance that the fate of a newspaper comic strip character can provide a nation with table talk, or that telephone traffic in large cities drops to low points at an hour when a comedy Negro pair discusses its daily troubles. Perhaps the motion picture provides the best illustration. Pictures are taken by thousands upon thousands of people with a seriousness that may escape the attention of the casual observer. The editor of one of the monthly "fan" magazines receives about 80,000 letters a year from men and women who write to unburden themselves upon all conceivable subjects pertaining to the motion picture. Examination of a sample of these letters indicates conclusively the grip the screen has upon its audience. A single article, somewhat uncomplimentary to a prominent actress, brought 15,854 unsolicited letters within a month after publication, protesting or praising, according to the writers' particular biases with reference to the star in question. Hundreds of letters contain the evidence that the actions of motion picture characters, their mode of dress, and the many details of the screen are furnishing the standards of conduct, taste and judgment for the 15,000,000 people who daily attend perform-

ances. If the motion picture possesses vitality sufficient to modify conduct in such externals as dress or cut of hair, how much more effective it presumably is in shaping such intangibles as human attitudes. This same vitality colors newspaper and radio presentations. The "set" of the individual is favorable, and, with all three, amusement and a touch of the dramatic are combined to catch and hold interest. There is constant repetition, and above all, the materials are prepared for calculated ends by men highly skilled in the practical social psychology of mass consumption.

In short, the world of 1933 is characterized by a bombardment of the individual with suggestions that reach him through a totally new type of integrated communication mechanism. How is the school adjusting itself, and how is it attempting to adjust the student for a life in which such mass impression presumably plays a dominant role in inculcating and transforming modes of thought? I can conceive of no more important field of educational research than that which builds upon such facts as are presented in the report relating to mass impression and attempts to ascertain the social consequences that are involved.

The problems, for illustrative purpose, may be dually classified: those that pertain to the individual as a consumer of advertised merchandise; those that involve his social attitudes in other spheres of interest.

Robert Lynd in his chapter on "The People as Consumers"[5] shows the complexities confronting men and women who do not make a living, but buy it. Contemporary commercialism, of which advertising is an indispensable adjunct, makes difficult the role of purchasing-consumer. "The consumer's problem is one of selection to a degree never before known. Industry in turn faces the necessity of competing not merely against rival makes of the same commodity, but to an unprecedented extent, against the entire field of alternate goods and services in the 'ever widening arena of strife for a share of the consumer's dollar'."[6] It is an intricate set of factors that determines the ultimate purchases of the individual, and it is becoming more intricate, as Lynd's review of merchandising practices makes apparent. Figures show the volume of modern advertising, designed "to break down consumer resistance; to create consumer acceptance; to create consumer demand." The complexities that come with branding, and the shift to packaged goods are outlined, and also the constant search for "million dollar merchandising ideas

[5] *Recent Social Trends in the United States.* Chapter XVII.
[6] *Recent Social Trends in the United States.* P. 858.

(such as *halitosis*)," which, in many instances, make it harder for the purchaser to know what he is actually buying. Attempts to make style, rather than price or quality the dominant criterion in selection, have not been without success. Lynd reports that in 1928 the National Retail Furniture Association set out to raise four million dollars to be expended in changing consumer habits in that field from price to style. His analysis of women's magazines shows that the style factor is increasingly important in women's clothing.

In what way is the school attempting to engender more intelligent consumption habits, and to innoculate the individual against such spurious suggestions as may reach him constantly through the media of mass impression? On a recent evening I sat studying an advertisement in which was pictured a child in a school room, kept after school because he was a "sluggard" from coffee drinking; at the very instant, a doctor, in a sponsored radio program was telling me that modern science proves that coffee is not harmful, that it increases efficiency, and will increase work-output. Is there any responsibility on the part of the school to protect the individual against the new techniques that the new communication agencies make possible? How is the individual to be guarded against exploitation that comes with the involuntary capture of sight and hearing at every turn? Is there not need for a psychology of sales resistance with which to equip the student, and the adult as well? Is not the development and inculcation of this a function that the school must perform (even in the lower grades) if it is to send out from the classroom men and women who are really equipped to take their places in the kind of a world we now live in?

Important as consumption habits may be, general social attitudes are more important. The school is engaged in training young men and women for life in a rapidly changing social environment. To what extent can this training of the school as now given withstand the constant influences of mass communication? On the one hand are those modes of thought and conduct the school seeks to implant; on the other are persistent and often contrary suggestions and influences reaching the individual with greater and greater frequency and moulding his attitudes in matters that touch all phases of his life. Which set of influences is stronger; which more profoundly motivates conduct? One cannot fail to ask these questions after considering the facts on mass communication as presented in the report. How effective in the face of all of this is the school? Here is a clear challenge for further educational research in so-

cial attitudes. How can the school develop in the student the judgment that is followed by refusal to accept the standard motion picture stereotype of Italian gangsters, or Oriental villains? How is the lesson from the history course to stand unshaken against the assault of a film presentation of Russians as bomb throwers and destroyers of the home? How can the virtue of modest wants and the satisfaction of living contentedly within one's means resist the prestige, the power of luxury standards set by film and printed advertisement? In short, how can the somewhat unemotional facts of the classroom withstand the pressure of vigorous stereotypes that mass impression brings constantly to the citizen? Does education now create an inner core of resistance that is not subject to erosion?

Potentially, the agencies of mass impression are capable of use in diffusing information and entertainment of the highest order. Yet it is scarcely to be questioned that as now utilized they must often breed stereotypes incompatible with the purposes and aims of education. Perhaps there is need for re-examination (assisted by research) of the aims and methods of modern education to ascertain how well they conform to the new communication-ridden world which the student enters from school. Such examination does not properly fall to the expert in communication who traces the changes, but rather to the educational researcher who can more fully explore the implications for education.

Social Thinking and Education.—In their concluding section of the report, the Committee writes: "The clarification of human values and their reformulation in order to give expression to them in terms of today's life and opportunities is a major task of social thinking. The progressive confusion created in men's minds by the bewildering sweep of events revealed in our recent social trends must find its counterpart in the progressive clarification of men's thinking and feeling, in their reorientation to the meaning of the new trends." This statement seems warranted after reading the vast collection of data the report contains. There is need, as the committee contends, for social values that will assist the individual in comprehending the meaning of existence, and seeing life whole. What social values are now derived from the school? Here, too, is a problem for educational research. Does the school now effectively train for life in a complex and shifting environment?

In a recent book of unusual significance Otto Rank[7] stresses what to him is the dilemma of modern education. The school, he argues, is pri-

[7] Rank, Otto. *Modern Education.* New York: Alfred A. Knopf, 1932.

marily concerned with the inculcation of a philosophy of individualism while the requisite of social life is a well grounded group ideology. Like the Hairy Ape in the play by Eugene O'Neil, the successfully adjusted man or woman feels that he "belongs," in short, sees his place even in a complex social organization. It is by social values that such meaning in life is achieved.

To enter the field of social values is somewhat dangerous, in part because it has somehow been considered "unscientific" to discuss them; in part because their lack of tangibility makes study of them difficult. Neither reason is, however, a justification for failure to introduce them as subject matter for educational research. No one can follow the logic of the various chapters of the report and fail to be impressed with the need for social rather than self-centered thinking in 1933 and thereafter. Social thinking rests upon values which give perspective. One consequence of the changes which the committee traces in its 1600 pages is the destruction of such values and perspective. "The Committee does not exaggerate the bewildering confusion of problems; it has merely uncovered the situation as it is. Modern life is everywhere complicated, but especially so in the United States (where the changes) have hurried us dizzily away from the days of the frontier into a whirl of modernisms which almost passes belief." Life lacks, it would seem, a significant focus. The responsibility for the distortion of contemporary values lies in part upon the agencies of mass communication already discussed, through which the insignificant is stressed to the point of seeming importance, and the significant, figuratively speaking, is placed upon the inside pages. It is not the intention here to suggest a concrete program of values which the school should be instilling, nor to discuss how any such values may be made effective. These are matters for the expert in education and educational research. But it is being pointed out that a study of the report makes it conclusive that social values have a place of no less importance than the multiplication table or spelling in the content of the school curriculum. Though the specific values may not be handed down like the commandments of old, there is a responsibility upon the school to marshal and present materials dealing with modern life in such a manner that the student, seeing the interrelationships and sensing the significance, will achieve the insight which permits and induces him to fashion his social values for himself.

No brief review can pretend to reveal the innumerable research leads and array of suggestive ideas that will be found on almost every page of

the report of the Committee on Social Trends. In truth, the facts that have been systematized assume most importance when they are accepted not as ends in themselves but as the starting point for further thought and contemplation. As presented they reveal fundamental implications which will provide hypotheses for research in education as well as other fields.

It has been the purpose of this paper merely to illustrate the kinds of questions that may be pertinently raised in one field of human experience, education, as a result of the preparation and publication of this comprehensive document.

HOW STUDENTS STUDY FOR THREE TYPES OF OBJECTIVE TESTS

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THE PROBLEM

TEACHERS in general are well aware of the fact that tests are powerful stimulants to study. What kinds of study are, on the other hand, motivated by the several available types of test, is another matter. On this question the profession has as yet but little information.

In a recent investigation[1] it was shown that college students do not study in the same way for essay tests (the traditional type) as for objective tests. When they review for the former they look for the main points and endeavor to strengthen their grasp of subject-matter in large units taken as wholes. In reviewing for objective tests, on the contrary, they look for details and work with small units.

The objective of the present investigation is to raise the same question in respect to three types of objective tests. Do students review for the listing recall type of objective test in the same manner as they review for completion or for true-false tests? If they do not, what methods of study do they find especially well adapted to this type and to that type? When the evidence on these questions has been weighed, it may be possible to point out conclusions in respect to the use of different types of tests to which teachers should give consideration when they lay out their instructional plans.

The subjects of the present investigation were 135 students, mainly juniors and seniors, in five classes in psychology during the summer session of 1932 at the University of Alabama. At the beginning of the term each of these classes was informed that its first, second, and third tests would be of the listing recall, completion, and true-false types of objective tests, respectively. Each student was given a mimeographed sheet containing six or eight sample questions of each kind. "Name the three major types of human behavior" (with three blank lines under the statement and a reference to the textbook in which the question is answered) is a typical sample, though one of the shortest, of the kinds of questions which made up what is called in this study the listing recall type. The

[1] Terry, Paul W. "How Students Study for Objective and Essay Tests," *Elementary School Journal*, XXXIII (April, 1933), pp. 592-603.

completion questions consisted of sentences with one or occasionally two blank lines for the insertion of the words that had been stricken out. The true-false questions were statements of the sort ordinarily used for tests of that kind.

When the students were promised that the tests would be like the samples they knew on each occasion what type of test to expect. Whether they used the same or different methods of study in reviewing for different types of tests they had opportunity to practice the habits of work to which they were accustomed. They did this, moreover, clearly conscious of the existence of these two possible courses of action because the instructors, while carefully refraining from disclosing their own attitudes, had taken pains to raise the issue.

When the third test had been held, a check list was distributed, on which was described fifty methods of reviewing (see lists W, X, Y, and Z below). At the right of each method were four columns. Methods which the student seldom or never used or which he considered not especially good for any test were to be checked in column I and in no other. The methods which he had found especially well adapted to the listing recall test were to be checked in column II; those well adapted to the completion test in column III, and those to the true-false test in column IV. Any method could be checked in one, in two, or in all three of columns II, III, and IV.

This check list was the same as that used previously in the investigation above referred to except that seventeen methods (of 67) that had been checked most frequently in the "seldom or never use" column in that study were left out. The omission of these methods had little or no bearing on the value of the check list because the methods which the student actually used remained on the list. The correlation of the split halves of the old check list, when stepped up with the Spearman-Brown formula, was found to be .924. In view of these facts, it is believed that the data obtained with the new check list are fairly reliable for the purposes for which it was used.

DO STUDENTS STUDY DIFFERENTLY FOR DIFFERENT TYPES OF OBJECTIVE TESTS?

The question to be considered first is: Do students review in the same way or in different ways for different types of objective tests? As was pointed out above, the student could check a method under one, under two, or under all three types of tests. Checking a method under one type

only (a single check) indicated that he considered the method especially well adapted to that test and to that one only. As far as that method was concerned his judgment was *absolutely* discriminative in favor of that test as against the other two. Checking a method under two tests only (a double check) indicated that he considered it well adapted to two tests, but to those two only, and his judgment was partially discriminative in favor of two tests as against the third. Checking a method under all three tests (a triple check) indicated that he considered the method as good for one test as for another. Judgments of this kind may be described as non-discriminative. Single and double checks, therefore, indicate different ways of reviewing for different types of tests while triple checks imply studying in the same way for all three types alike.

TABLE I

AVERAGE NUMBER OF METHODS CHECKED DISCRIMINATELY AND NON-DISCRIMINATELY BY THE FIVE SECTIONS

Section	Discriminating Checks			Non-Discriminating Checks	Total Number of Checks
	Single	Double	Single and Double	Triple	
IA (34 cases)					2189
Average number of methods	16.5	8.7	25.2	10.2	
Range, by individuals	2-34	0-20	8-41	0-25	
67 (25 cases)					1629
Average number of methods	16.4	8.7	25.1	10.4	
Range, by individuals	0-33	0-27	2-38	1-31	
63 (29 cases)					2046
Average number of methods	15.4	10.5	25.9	11.4	
Range, by individuals	2-24	1-28	3-43	0-29	
156 (24 cases)					1520
Average number of methods	12.4	6.0	18.4	13.0	
Range, by individuals	0-42	0-18	1-43	0-28	
IB (28 cases)					1405
Average number of methods	10.8	8.0	18.8	11.4	
Range, by individuals	0-27	1-16	3-38	0-25	
Five sections (135 cases)					
Total number of checks	1966	1145	3111	1511	8789
Percent of grand total	22.4	26.1	48.4	51.8	100.0
Average number of methods	14.6	8.5	23.1	11.2	
Percent of the 50 methods	29.1	17.0	46.1	22.4	
Range of section averages	10.8-16.5	6.0-10.5	18.4-25.9	10.2-13.0	
Range, by individuals	0-42	0-28	1-43	0-31	

With these distinctions in mind and turning to the bottom of Table I, it may be seen that a total of 1966 single checks was used. This number is 22.4 percent of the grand total of 8789 checks placed in columns II, III, and IV. The double checks number 1145 or (1145 times 2) 26.1 percent. The sum of the single and double checks, 4256 [1966 plus (2 times 1145)], is 48.4 percent of the grand total. Almost one-half of the total number of checks used (in columns II, III, and IV), in other words,

represent judgments of absolute or partial discrimination as to the adaptability of the various methods to the three types of tests.

Continuing at the bottom of Table I it may be seen that the average number of methods single checked by each student was 14.6 or 29.1 percent of the fifty methods. An average of 8.5 methods (17 percent) was double checked. Each student on the average, therefore, either single or double checked 23.1 methods. That is to say, the average student judged almost one-half (46.1 percent) of the methods to be better adapted to one or to two of the three tests than to the other. Substantially the same conclusions may be drawn, in respect to each of the five sections, from the data in the upper part of Table I.

Further light on the extent of the practice of discrimination is to be had by ascertaining how few the subjects were who used single checks and double checks very sparingly. Only four students used no single checks; only 22 (or 16.3 percent of 135) used less than six. Only 21 students used less than eleven single and double checks taken together. In other words, 114 students, over four-fifths of the entire group (84 percent), checked more than ten (20 percent) of the fifty methods in a manner indicating discriminative judgments as to their adaptability to different tests. This fact undoubtedly explains the insistent demand of so many students for advance information concerning the form, as well as the content of impending tests.

A few individuals used triple checks almost exclusively, though no individual used them altogether. The students who used triple checks practically without exception are those who employ the same methods of reviewing regardless of the form of an impending test. Some of them appear to be rather indifferent students, but others are competent scholars who say they are interested primarily in learning and that they do not care or do not have to care what kind of test is given. The value of this attitude, even though few seem to take it, appears to the writer well worth further study.

TABLE II

DISCRIMINATING CHECKS PLACED ON THE THREE TYPES OF TESTS

Number of Checks (135 Cases)	Type of Test			All Three Types
	Listing Recall	Completion	True-False	
Total	1913	1282	1061	4256
Percent of grand total	44.9	30.1	24.9	100.0
Average, per student	14.2	9.5	7.9	31.5
Range on 50 methods	10-80	8-73	3-58	
60 percentile point	34.2	20.6	15.6	

METHODS BEST ADAPTED TO THE THREE TYPES OF TESTS

If discrimination is the rule, the question to consider next is: Which methods of reviewing are best adapted to different types of tests?

The data used in the consideration of this question include the single and double checks only for the reason that these checks, and these alone, represent discriminative judgments. A summary of the data is found in Table II. After throwing the number of checks against each of the fifty methods into distribution tables for each of the three tests the percentile points were calculated. It was found that taking the methods with frequencies above the 60th percentile gave the largest number of methods to be listed under one test only in each of the three series. Lists W, X, and Y below include the twenty methods checked most frequently as best adapted to the listing recall, completion, and true-false tests, respectively. In each list the methods with high frequencies under one test only have been set apart from those with high frequencies under more than one test.

List W

Methods of Reviewing for the Listing Recall Test

I. Checked frequently under listing recall test only
   1. Look chiefly for the main points in reviewing a chapter
   2. When beginning the review of a chapter quickly get a preliminary general idea of the main topics covered in the chapter
   3. Try to recite or recall the sub-topics, center heads, and side heads of a chapter
   4. Run through a chapter attempting to recite or recall the main points under the center heads and side heads
   5. Read the table of contents attempting to recite or recall the main points under each sub-topic
   6. Write a full outline of each chapter including the center heads and side heads found in the textbooks and the main points under each of the latter
   7. Write an outline of each chapter including main topics and sub-topics of one's own selection and written in one's own words
   8. Study the written outline of a chapter as an integral unit or whole
   9. Review the tables or charts in the textbooks to get the main ideas of each

II. Checked frequently under both listing recall and true-false tests
   Methods 16 and 17 in list X

III. Checked frequently under both listing recall and completion tests
   Methods 29, 30, 31, 32, 33, 34, and 35 in list Y

Returning to Table II it may be seen that the average student checked 14.2 methods under the listing recall test—a decidedly greater number than he checked under either of the others. In list W there are nine methods which were not checked frequently (i.e., above the 60th percentile) under either of the other tests. Evidently the students were more decisive or more confident in selecting the methods of study best adapted to this test. On inspection it appears that these nine methods are concerned chiefly with getting at the main points. They deal with large units of subject-matter like chapters; several refer to outlines; many of them call for earnest, persistent, and well organized thought. These are the characteristics of the methods which were checked most frequently under essay tests (as distinguished from objective tests) in the previous investigation to which reference was made above. Six of the nine methods found exclusively in list W are among those considered best adapted to essay tests (list B) in that study. What appears at first sight to be an element of contradiction between the two studies is probably fully explained by facts brought to light by Sims in a recent report. He showed that several kinds of questions commonly used in essay tests, including those here described as the listing recall type, really are objective in character and should better be included only in objective tests.[2] The teacher who desires his classes to employ the methods of reviewing included in List W can easily lead them to do so by announcing an objective test of the listing recall type.

List X

Methods of Reviewing for True-False Tests

I. Checked frequently under true-false test only
   10. Write out a list of the authors of experiments described in the textbooks
   11. Recite or recall various isolated or unrelated facts, rules, definitions, etc., after reading a chapter
   12. Carefully read the entire text of a chapter through from beginning to end
   13. Reread difficult or obscure passages
   14. Write out and mark a few objective test statements for practice
   15. Summarize mentally the thought of related paragraphs

II. Checked frequently under both true-false and listing recall tests
   16. Digest the findings of experiments
   17. Examine carefully concluding summaries at the ends of chapters

[2] Sims, V. M. "Essay Examination Questions Classified on the Basis of Objectivity," *School and Society*, XXXV (January, 1932), pp. 100-102.

III. Checked frequently under both true-false and completion tests
Methods 19, 20, 21, 22, 23, 24, 25, 26, 27, and 28 in list Y

The methods of reviewing checked most frequently under the true-false test exclusively are found in List X. These methods are concerned with facts and definitions and with the authors and findings of experiments. Number 15 contains the only suggestion of organized thinking: most of the reading involved is of a meticulous kind designed to yield rules, definitions, and other data in a scattered way. There is little evidence of an understanding, on the part of the students, of the fact that true-false questions can be constructed in such a way as to make systematic and selective methods of reviewing profitable.

In List Y, it may be seen that one method alone, number 18, was checked frequently under the completion test only. It emphasizes word for word mastery of important ideas. The students who gave these checks evidently did not understand the fact that their completion tests had always been scored for correctness of ideas rather than for the recall of specific words. Possibly, also, they may not have had confidence in their vocabularies.

List Y

Methods of Reviewing for Completion Tests

I. Checked frequently under completion test only
   18. Memorize important selected passages
II. Checked frequently under both completion and true-false tests
   19. Look chiefly for details in reviewing a chapter
   20. Underscore striking words or phases while reviewing a chapter
   21. Underscore the most important sentences while reviewing
   22. Review the material a second time concentrating on the underscored passages
   23. Learn the meanings of unfamiliar terms
   24. Notice words or phrases that appear to be especially significant
   25. Practice reciting or recalling the key sentences of paragraphs while reading
   26. Try to understand, while reviewing, the full meaning of each sentence
   27. Consciously look, while reading, for sentences which appear likely to be selected by the teacher as material suitable for objective test statements
   28. Pay special attention to applications or examples in the textbooks of important principles, rules, laws, etc.
III. Checked frequently for both completion and listing recall tests
   29. Concentrate on the passages underscored previously, *i.e.*, when the material was first assigned

30. Write down underscored passages that are difficult to recall
31. Write out selected items such as definitions, conclusions of experiments, outstanding facts, etc.
32. Write out selected series of related items such as lists of laws, rules, principles, steps in a process, etc.
33. Reread, recite, or recall series of related items such as lists of laws, rules, principles, steps in a process, etc.
34. Recall or recite the main points under the sub-heads of an outline
35. Look up in the textbooks points in an outline which cannot be recalled readily

IV. Checked frequently for all three types of tests
36. Associate the name of the experimenter with his experiment
37. Try to apply important principles, rules, laws, etc., to the experiences of every day life

Seventeen of the twenty methods in List Y were checked frequently under either the true-false or the listing recall test also. The data presented in lists W and X show that the students were able to make a number of sharp distinctions between the methods best adapted to the true-false and to the listing recall types. This is not true of the completion test. The methods in the completion—true-false group (group II, List Y) emphasize word and sentence study. Those in the completion-listing recall group (group III, in List Y) emphasize organized thought about selected ideas as well as the acquisition of facts. The completion test may in truth demand a greater variety of study habits than either of the other tests. It may be true, on the other hand, that the students know less about how to study for it effectively. In the case of the completion tests especially, it might be very profitable for teachers and their classes together to attempt to discover the most effective methods of reviewing.

List Z

Methods of Reviewing Seldom or Never Used

I. Checked frequently as seldom or never used only
38. Write out and mark a large number of objective test statements covering comprehensively the material included in the test
39. Write out the related ideas under broad topics which are discussed in more than one chapter of the textbooks
40. Write a skeleton outline of each chapter including only the chapter heads and center heads found in the textbooks
41. Memorize an outline

42. Try to recite or recall the sub-topics of a chapter in one's own words
43. Compare or relate mentally the main ideas of one chapter with those of other chapters
44. Organize related chapters mentally into larger groups and think over their relationships
45. Try to evaluate important principles, rules, laws, etc., as regards their usefulness to one's self
46. Study with one or more other members of the class
47. Try to "spot" the questions that are likely to be asked

II. Checked frequently both as seldom or never used and under one or another type of test
Methods 3, 5, 6, 7, 8, 10, 11, 14, 18, and 19 in lists W, X, or Y

III. Methods not checked frequently under any test nor in column I

48. Conclude preparation with a final review just before going to the test
49. Review especially the topics that were discussed in the classroom
50. Study notes of lectures and discussions

List Z includes the methods checked most frequently as seldom or never used or as not especially good for any test. They consist chiefly of laborious writing or of thinking in the widest relationships, procedures which are seldom irresistibly tempting to the interests of the average student.

INDIVIDUAL DIFFERENCES IN DISCRIMINATION

The examination of a few individual cases may throw further light on the judgments of students in respect to the adaptability of methods of reviewing to the three types of tests. In Table III five cases are described. Student A in his checking approximated the averages that are presented in the bottom row. Student B employed triple checks almost entirely: he is one of those who study in the same way for all three types of tests. The three remaining cases discriminate to the average extent or more. Student C used many single checks a considerable number of which were placed under the listing recall test. Student D was one of the few who placed many checks under the completion test as Student E was one of the few who emphasized the true-false test in his checking. The range of individual differences, it appears, is as great in respect to this trait as to others.

Taking the sum of the number of single and double checks as the measure of discrimination and the score on an objective test of 257 items

TABLE III

INDIVIDUAL DIFFERENCES IN DISCRIMINATION AS TO THE ADAPTABILITY OF METHODS TO THE THREE TYPES OF TESTS

Student-Description	Number of Checks Indicating			Number of Methods Checked as Used and Checked				Total Number Checks Placed on		
	Don't Use	Use	Total	Single	Double	Single and Double	Triple	Listing Recall	Completion	True-False
A. Approximates the average	13	75	88	14	8	22	15	34	21	20
B. High on triple checks. Non-discriminating	28	64	92	0	2	2	20	22	21	21
C. High on single checks, listing recall, and, discrimination	11	61	72	24	8	32	7	33	15	13
D. High on completion and listing recall. Average on discrimination (single and double checks)	13	77	90	11	12	23	14	34	29	14
E. High on true-false. High on discrimination (single and double checks)	6	77	83	22	11	33	11	23	22	32
Average of 135 cases	15.9	65.1	81.0	14.6	8.5	23.1	11.2	25.3	20.6	19.2

as the measure of scholarship, an effort was made to discover any relationships that might exist between these functions in the case of 53 students in two sections. The Pearson product-moment correlation was $.10 \pm .09$. An insignificant correlation between scholarship and discrimination as to the methods best adapted to objective and essay tests was found also in the previous investigation referred to above. In this connection it is interesting to recall Eurich's finding that only nine items in a check list of 100 "habits of studiousness" yielded significant differences in the scores of high and low grade students.[3] Evidently some good and some poor students use the same methods while some use different methods in preparing for different types of tests. Possibly the zeal and the skill with which the student works determine his success as a scholar as much as the particular set of methods which he employs.

CONCLUSIONS

Throughout this study it has been assumed that how students study for a test is properly as much a matter of concern, on the part of the teacher, as what they study. A decided majority of the students who served as subjects in this investigation study differently for the three

[3] Eurich, Alvin C. *The Reading Abilities of College Students* (Minneapolis, Minnesota: University of Minnesota Press, 1931), p. 64.

types of objective tests. The kind of test to be given, if the students know it in advance, determines in large measure both what and how they study. The behavior of students in this habitual way places greater powers in the teacher's hands than many realize. By the selection of suitable types of tests, the teacher can cause large numbers of his students to study, to a considerable extent at least, in the ways he deems best for a given unit of subject-matter. Whether he interests himself in the question or not most of his students probably will use the methods of study which they consider best adapted to the particular types of tests customarily employed.

Although the subjects of this investigation were college students in classes in psychology, the significance of its conclusions appears to be extensible both to the secondary school levels of instruction and to other subjects of a content nature.

TECHNICAL VOCABULARIES FOR PLANE AND SOLID GEOMETRY[1]

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THE studies of general vocabularies and vocabularies for school subjects that have been made in recent years indicate a growing recognition of the need for a more accurate understanding of pupils' word knowledge. For more than five years the writer has been working on vocabularies for geometry and studying the contributions of others to this field. A preliminary article was published three years ago.[2] The present paper consists of four parts: I. an examination and evaluation of three recent vocabularies for geometry; II. discriminating word studies of six textbooks on geometry; III. results obtained from a questionnaire sent to more than three thousand students of geometry in the public high schools of one large city; and IV. the technical vocabularies.

PART I. AN EXAMINATION AND EVALUATION OF THREE RECENT VOCABULARIES

The first pamphlet[3] contains "Technical Geometry Vocabulary." The author says that the vocabulary for plane geometry "should contain all the words which are peculiar to plane geometry" and that "several geometry texts were analyzed and all the important words were recorded." This vocabulary contains six hundred items. These include five types of words which are not "peculiar to" the elementary plane geometry of the high school: (1) words which are in the first thousand of both the Thorndike[4] list and the Horn[5] list (as arm, common, left, like, number, and value); (2) words which belong to algebra and arithmetic (as add and equation); (3) words which belong to related sciences (as

[1] This paper was written for presentation before Section X of the International Congress of Mathematicians held in Zurich, Switzerland, September 4-12, 1932. A summary was published in *Internationaler Mathematiker-Kongress Zurich, II Band, Sektions-Vortrage* (Zurich: Orell Fussli Verlag, 1932), pp. 209-210.

[2] "The Vocabulary of Plane Geometry," *Journal of Educational Research*, XX (December, 1929), pp. 392-94.

[3] Welte, Herbert D. *A Psychological Analysis of Plane Geometry* (Iowa City: University of Iowa, 1926), pp. 17-20.

[4] Thorndike, Edward L. *The Teacher's Word Book*, Second Edition. New York: Teachers College, Columbia University, 1927.

[5] Horn, Ernest. *A Basic Writing Vocabulary*, Iowa City: University of Iowa, 1926.

fulcrum and navigation); (4) words which belong to analytic geometry (as abscissa and parabola); and (5) words which belong to solid geometry (as tetrahedron and zone). This vocabulary contains words which are listed in the National Committee's Report[6] as "terms to be abandoned" (as antecedent, conjugate, homologous, and scalene).

The second pamphlet[7] contains three lists: common mathematics vocabulary, geometry, and algebra. The first list contains words common to arithmetic, geometry, and algebra, and the second and third lists words peculiar to geometry and algebra respectively. The first list contains one hundred and forty-five items; of these one hundred and nineteen are "most important" and the others are "somewhat less important but should be known." The geometric list contains three hundred and seventy-seven items; of the two hundred "most important," forty-six are marked algebra and twenty-six arithmetic; twenty-nine of the "less important" are marked algebra and fourteen arithmetic. Comparisons of these lists yield some curious results; for example, the words similar, equilateral, geometry, mathematics, parallel, radius, vertex, and vertical are common to arithmetic, geometry, and algebra, but similarly, equiangular, geometric, mathematician, non-parallel, radii, and vertices are peculiar to geometry. This geometric list contains words which the National Committee recommended be abandoned and words belonging to analytic geometry and physics.

The authors of the third article[8] say that after the words had been obtained from "three standard" texts in geometry, thirty-eight teachers of geometry rated them as to the importance of each word for teaching and the authors themselves decided upon "the actual 'technical-ness' of each word, as to its general social value outside of specialized work in geometry." This list contains sixty-one single words, such as "pi," and fourteen sets of two words such as acute angle and regular polygon. In some of these phrases artificial difficulties have been introduced; for example, "included angle" is meaningless, but the whole phrase "two sides and the included angle" is perfectly plain. All but twenty-two

[6] National Committee on Mathematical Requirements, *The Reorganization of Mathematics in Secondary Education*. (The Mathematical Association of America, Inc., 1923), pp. 76-77.

[7] Pressey, Luella Cole. *The Technical Vocabularies of the Public School Subjects: Section 4; Geometry and Algebra*. Bloomington: Public School Publishing Company.

[8] Pressey, S. L., Pressey, L. C., and Zook, R. C. "The Essential Technical Vocabulary of Plane Geometry," *School Science and Mathematics*, XXXII (May, 1932), pp. 487-89.

items of this Pressey-Zook list are in the algebra or arithmetic Pressey lists. There are only about thirty words in the Pressey-Zook list that are not in either the Thorndike list or the Horn list. Even these words are not all new to the pupil; for example, the meaning of the word mid-point is suggested by the words midday, midnight, midsummer, and midwinter. Nevertheless, the authors say that "so many words are so highly special and have no little general value" and that the fundamental concepts of geometry "do not seem to enter into the ordinary person's daily life." Twenty-seven items are marked as having "little practical value outside the classroom." One of these is the familiar word "construction," which appears even in a telephone directory and is in the second thousand in Horn's list.

It is futile to try to obtain geometric vocabularies by the mechanical listing of the words of a few textbooks, even if someone does regard them as standard texts, and even if the lists are pruned by teachers looking for "importance for teaching" and by psychologists seeking "general social values." Not all words in a textbook in geometry are equally important and useful. Unfortunately there are some geometry teachers whose vision of the subject is limited by antiquated textbooks, tests, and examinations made out by persons who consider that the content and methods of high-school geometry to-day should be exactly as they were twenty-five or thirty years ago. What are general social values if words to be found in the first two thousand of Thorndike's or Horn's list have little or no general social value?

PART II. DISCRIMINATING WORD STUDIES OF SIX TEXTBOOKS

Five textbooks whose copyright dates are 1931, 1929, 1929, 1928, and 1910 will be referred to as number 1, number 2, number 3, number 4, and number 5, respectively. Word counts of the introductions revealed the facts that the total number of words varied from almost 3200 for number 1 to almost 7800 for number 2, and that the number of different words ran from 425 for number 1 to 916 for number 2. The average number of times that each word was used extended from 7.3 for number 3 to 8.5 for number 2. The words which were not in either Thorndike's list or Horn's list were separated into two groups according to whether or not they were essentially geometric terms. With few exceptions, the meaning of every word of the first group was either given in a formal definition or was plainly evident from the context. The words

of the second group occurred chiefly in exercises, and in many cases the meaning was evident from a picture or from the context.

The whole books were then studied to find, (1) whether certain terms were used in the statements of theorems, (2) whether the words recommended by the National Committee as words to be abandoned were used, and (3) whether certain other words which are not needed in an elementary course were employed. The terms *isosceles, concurrent, subtend,* and *mutually equiangular* are not used in the statements of theorems of the lists of the College Entrance Examination Board,[9] the National Committee, or New York Regents.[10] These theorems are thereby rendered more simple and clear to the student. Nevertheless, in the statements *isosceles* is used in numbers 1, 2, 3, and 5; *concurrent* in numbers 1, 3, and 5; *subtend* in numbers 2 and 5; and *mutually equiangular* in numbers 1, 2, 4, and 5. Certain words recommended by the National Committee to be abandoned are also used: *antecedent* and *consequent* in numbers 1, 3, and 5; *equivalent* in numbers 1 and 5; *scalene* in numbers 1, 3, 4, and 5; *subtend* in numbers 2 and 5; and *homologous* in numbers 1 and 5. The terms *conjugate, perigon, Q.E.D., reflex, rhomboid,* and *trapezium* are used in number 5. The words *circumcenter, excenter, incenter,* and *orthocenter* are used in number 3 and number 5, although such words are generally recognized as unsuitable for an elementary course. In a sixth textbook (copyright, 1927) there is a word list arranged in sixteen groups of fifteen words each and a group of fifteen proper names. No explanation is given as to any underlying principles used in the selection of these words or as to their arrangement in groups. The pupil is advised "to learn to spell, pronounce, and use." Slightly more than half the words are in Thorndike's list or Horn's list. The other words include words such as centroid, concave, curvilinear, orthocenter, nonagon, similitude, quatrefoil, radicand, perigon, and scalene.

PART III. RESULTS OBTAINED FROM A QUESTIONNAIRE

The writer was granted permission by the superintendent of the public schools of a large city to send the following questionnaire to the students of plane geometry and of solid geometry in the public high schools of that city:

[9] Document No. 108, New York: College Entrance Examination Board, 1923.

[10] University of the State of New York, The State Department of Education *Syllabus in Plane Geometry.* Albany: The University of the State of New York Press, 1927.

"I. Check the part of Geometry which you are now studying:

Plane Geometry 1 Plane Geometry 2 Solid Geometry

"II. The following twenty-six words are used frequently in geometry. Explain in your own way the words which you understand, but do this without help from any book or person."

The numbered words were arranged in a column, with a numbered space opposite each word for the explanation. The words were: 1. arc, 2. apothem, 3. bisect, 4. circle, 5. circumscribe, 6. circumference, 7. congruent, 8. chord, 9. diagonal, 10. geometry, 11. hypotenuse, 12. intercept, 13. locus, 14. median, 15. parallelogram, 16. perimeter, 17. polygon, 18. proportional, 19. ratio, 20. secant, 21. segment, 22. tangent, 23. theorem, 24. transversal, 25. trapezoid, 26. vertex.

Answers were received from almost 1200 students of plane geometry 1, from more than 1500 students of plane geometry 2, and from about 350 students of solid geometry. In these schools plane geometry 1 (*i. e.*, the first semester) includes the introduction, Book I, and Book II through the measurement of angles. But as the questionnaires were answered in most cases six or seven weeks before the end of the semester, the words which the student might be expected to understand were those numbered 1, 3, 4, 6, 7, 9-15, 17, 21, 23, 24, and 26. The purpose in giving all the twenty-six words to students in the first semester of their study of geometry was to learn, (1) whether many were linguistically in advance of the class work, and (2) whether there was a tendency to guess at the meanings of words they did not know. These plane geometry terms were presented to students who had completed that subject, and were then studying solid geometry in order to discover whether their retention of these terms was good or poor.

The questionnaires of each group were first studied to obtain for each of the twenty-six words the percentage of papers in which no explanation was given. The percentages of these omissions are here given:

Word	P. G. 1	P. G. 2	S. G.	Word	P. G. 1	P. G. 2	S. G.
1.	9	1	0	14.	60	35	24
2.	96	75	31	15.	2	1	0
3.	1	1	0	16.	30	6	1
4.	6	1	0	17.	15	5	2
5.	54	5	1	18.	64	21	12
6.	5	2	1	19.	68	38	14
7.	2	2	1	20.	78	7	9
8.	57	1	2	21.	15	6	3
9.	10	5	1	22.	64	3	1
10.	13	8	5	23.	11	10	7
11.	13	3	1	24.	12	10	12
12.	17	8	9	25.	22	12	7
13.	35	20	6	26.	14	9	1

It will be observed that of the seventeen words that students in P. G. 1 might be expected to know, there are only three (intercept, locus, and median) that are omitted on more than 15 percent of the papers. The words *congruent* and *parallelogram* are omitted on only 2 percent of the papers and the word bisect on 1 percent. In plane geometry 2 there are twenty-one words whose omissions do not exceed 12 percent. The five words omitted more frequently are *apothem, locus, median, proportional,* and *ratio.* Seven words have omissions not exceeding 2 percent. In solid geometry there are twenty-four words whose omissions do not exceed 15 percent. The two words omitted more frequently are *apothem* and *median.* Fourteen words have omissions not exceeding 2 percent.

The next step in this study was a careful examination of every explanation to ascertain: (1) if the definition was incomplete, (2) if a special case had been explained, (3) if the word had been confused with another word resembling it in sound, (4) if the use of the word in some other subject had been substituted for its use in geometry, (5) if a wild guess had been made, (6) if a formal definition had been memorized verbatim, and (7) if a correct explanation had been given, apparently in the pupil's own words. Reliable percentages could not be obtained for each of the seven subdivisions because of the overlapping. Hence a search was made for the general tendencies. If the explanation of any word showed exceptional originality, or indicated wild guessing, or exhibited a lack of command of simple English, all the explanations on that paper were compared with one another.

Of the seventeen words that belonged to the vocabulary of plane geometry 1 at the time of the test, it was found that the words *bisect, congruent,* and *parallelogram* were the best known, and that the words *locus* and *median* were the least well understood. In plane geometry 2 and in solid geometry additional words that were generally understood were *arc, circle, circumference, chord, diagonal, hypotenuse, perimeter, polygon,* and *tangent.* Additional words that were not well understood were *apothem, proportional,* and *ratio.*

The majority of the explanations of the word *locus* contained one or both of the words *path* and *equidistant.* A *locus* was defined as a path of a line, of a point, of a plane, of a moving point, and of a point moving under certain geometric conditions; and as a path in which a certain thing is likely to be found. *Locus* was also defined as equidistant from a point, a line, two lines, a circle; it was defined as a point,

a fixed point, a moving point, a line, a statement, a place, part of a place, the beat which a policeman walks, the place which is at all times equidistant from the given conditions. The definitions in plane geometry 2 were better than those in plane geometry 1; those of solid geometry were much better than those of plane geometry 2. It seems that the concept of *locus* is of slow growth. A median was said to bisect a line, the three sides of a triangle, all the angles of a polygon. It was also the go-between, something that bears the same relation to two other things, a mean proportional between two ratios, the average, the mark which shows the average of the class, as many above as below, the middle or near the middle.

The word *apothem* was confused with the words *altitude, assumption, axiom, hypotenuse,* and *hypothesis. Proportional* was defined as a ratio, a ratio of two or more numbers, the difference between two ratios, the same ratio, one of the parts of a ratio, a comparison of the numerical values of four numbers, an expression of equality between two numbers, similar but not congruent, a portion, in good form, an unknown line formed by the knowns. A *ratio* was defined as a radius, a proportion, the actual value of a proportion, a proportion of two things, a form of writing a proportion, a set of proportional series, a comparison of two or more things, a product of two numbers by two others, the relation which four quantities bear to each other, a fixed quantity, the times or the rate of times, when one thing is divided by another but their quotient is unknown.

The explanations of the word *intercept* show that the chief source of difficulty was confusion with the more familiar word *intersect.* The definitions of the words geometry and theorem gave evidence of careful thought and were remarkably free from guessing. The maturity and dignity exhibited by these students in answering these questionnaires is worthy of special mention. The writer recalls only two instances of childishness: "a polygon is a dead parrot" and "an apothem is a small animal."

The words of the questionnaire that caused the greatest difficulty are *apothem, locus, median, proportional,* and *ratio.* It is impossible to dispense with any of these words at present, but the writer suggests that *apothem* and *median* be included in the list of words to be removed from the geometric vocabulary in the near future. Each of these words is used only once in the statements of the theorems of the College Board, the National Committee, and the New York Regents. Apothem could

be replaced by "radius of the inscribed circle"; and "the medians of a triangle" by "the lines from the vertices of a triangle to the midpoints of the opposite sides." The word *locus* offers no insurmountable difficulty if sufficient time is allowed for the development of the concept. The words *ratio*, *proportion*, and *proportional* are indispensable for Book III. Nevertheless, *ratio* was omitted by 38 percent and *proportional* by 21 percent of plane geometry 2, and the attempted explanations were the poorest on the questionnaires. What is the cause of the difficulty? If the textbook or the teacher writes the old form a : b :: c : d and reads it "a is to b as c is to d" and if "theorems" about alternation, antecedent, consequent, inversion, composition, and division must be memorized there is small wonder that the student has no clear ideas of what it is all about. But if the textbook writer and the teacher realize that the high-school boy of to-day knows some algebra and arithmetic when he starts to study geometry and if they tell him that a ratio is a fraction and that a proportion is a fractional equation obeying the laws that govern fractional equations in algebra, then the student will find *ratio*, *proportion*, and *proportional* understandable terms.

PART IV. TECHNICAL VOCABULARIES FOR PLANE AND SOLID GEOMETRY

A basic technical vocabulary for plane geometry, as the term is used by the writer in this paper, means a list of those words which are not ordinarily understood by tenth-grade students but are indispensable in the study of the theorems and constructions of plane geometry as stated by the College Board, the National Committee, and the New York State Regents. A secondary technical vocabulary contains other words that are needed in the development of the theory, and words that were formerly used in the statements of the theorems and constructions and are still employed by the less progressive teachers, textbook writers, and makers of standardized tests. Words which the National Committee recommends to be abandoned are not included in these technical vocabularies even if they are used in one of the lists of theorems mentioned above: for example, the word *equivalent* is not included, although it is used by the College Board. In these technical vocabularies forms easily derived from a basic form are not given as separate words; but it is distinctly understood that the basic form includes the closely related terms; for example, the word *bisect* is understood to include bisected, bisecting, bisection, bisector, bisectors, and bisects. Words such as fungus, T-square, and fulcrum, which may be used in exercises or in

illustrative material, are not considered a legitimate part of any technical vocabulary for geometry.

The average of estimates of the number of words known by students in the tenth grade (where plane geometry is usually studied) is greater than 10,000.[11] Although there are 10,000 words in the Thorndike list and also in the Horn list, the lists are not identical. In the present investigation it was decided to reduce the number of words below 10,000 by counting as non-technical only those words that are in both these lists. There are two exceptions: (1) *right*, because the ordinary use of the word is wholly different from its geometric use in right angle and right triangle, and (2) *proportion*, because as popularly used it is a rather vague term, and because the study of the questionnaires showed that in some cases the word gave great difficulty.

It is distinctly understood that the number of terms defined in a textbook on geometry will be greater than the number of words in the basic and secondary vocabularies. But it is evident that the student will more easily grasp the precise geometric use of a non-technical word (such as acute) than that of a purely technical word (such as isosceles). It will be necessary to adapt any technical vocabulary to the needs of the gifted student and, in another way, to the requirements of the slow or dull pupil. Mastery of a vocabulary is not attained by merely memorizing formal definitions verbatim and reproducing them at given signals. Careful explanations of a term and varied experience in its use are needed. One of the popular misconceptions regarding a technical vocabulary for geometry is that it is static. Unfortunately, many who teach, administer, or test geometry think that it should be to-day exactly as it was thirty years ago. Such persons are unmindful of the rapidly changing character of high-school pupils. Terms such as *quadrilateral* and *isosceles* which had a rightful place in geometry when all students studied Latin and many took Greek also, have passed their days of usefulness and are rapidly becoming stumbling blocks to the newer type of high-school pupil. Although it is obviously impossible to delete such terms immediately, nevertheless, it is well to consider whether there are not terms that can be advantageously abandoned in the near future. It is for this purpose that the writer adds a list of words that could be easily replaced by simple phrases.

[11] For data, see Cuff, Noel B. "Vocabulary Tests," *Journal of Educational Psychology*, XXI (March, 1930), pp. 212-220.

BASIC TECHNICAL VOCABULARY FOR PLANE GEOMETRY

apothem	hexagon	perimeter	secant
arc	hypotenuse	perpendicular	segment
bisect	inscribe	polygon	semicircle
circumference	intercept	proportion	supplementary
circumscribe	intersect	quadrilateral	tangent
congruent	locus	radius	transversal
convex	median	ratio	trapezoid
diagonal	parallelogram	right	vertex
equidistant			

SECONDARY TECHNICAL VOCABULARY FOR PLANE GEOMETRY

axiom	decagon	midpoint	rectangle
compasses	equiangular	obtuse	rhombus
complement	equilateral	octagon	rigid
concentric	hypothesis	pentagon	sector
concurrent	isosceles	postulate	theorem
corollary		quadrant	

WORDS THAT COULD BE ADVANTAGEOUSLY REPLACED BY SIMPLE PHRASES

apothem	equiangular	isosceles	pentagon
concentric	equilateral	median	postulate
concurrent	hexagon	octagon	quadrilateral
decagon			

BASIC TECHNICAL VOCABULARY FOR SOLID GEOMETRY

cone	parallelepiped	polyhedron	symmetric
frustum	pole	prism	tetrahedron
lateral	polyhedral	pyramid	trihedral
oblique		slant	

ADDITIONAL WORDS

College Board: lune, reciprocally, skew.
National Committee: equiangular, equilateral, prismoid, reciprocally.
New York Regents: generate, lune, prismatoid (in formula), projection, zone.

SECONDARY TECHNICAL VOCABULARY FOR SOLID GEOMETRY

axis	directrix	icosahedron	prismoid
birectangular	dodecahedron	lune	(or prismatoid)
collinear	generatrix	nappes	trirectangular
coplanar	hemisphere	octahedron	truncated
dihedral	hexahedron		zone

WORDS THAT COULD BE ADVANTAGEOUSLY REPLACED BY SIMPLE PHRASES

birectangular	directrix	icosahedron	trirectangular
collinear	dodecahedron	nappes	truncated
coplanar	generatrix	octahedron	skew
dihedral	hexahedron	tetrahedron	

The basic technical vocabulary for plane geometry given in this paper can be obtained from the writer's earlier vocabulary (see footnote 2) by deleting the word *bisector* and adding the words *right* and *proportion* and seven words which are in Thorndike's list but are not in Horn's list.

The vocabularies for solid geometry consist of those for plane geometry plus additional lists built in the same way. However, as the requirements of the College Board, the National Committee, and the New York Regents show more variations in content and in terminology than in plane geometry, words that appear in only one or two of these requirements are listed separately.

CONCLUSIONS

I. Some of the recently published "Geometry Vocabularies" bear unmistakable evidence of poor workmanship. Moreover, they are not in harmony with recent tendencies in research in the teaching of elementary geometry.

II. Discriminating word studies and comparisons of recent textbooks and one of twenty years ago indicate a growing tendency on the part of textbook writers to realize the necessity of simplifying the technical vocabulary of elementary geometry.

III. The three thousand responses to a vocabulary questionnaire showed that the pupil's comprehension of a word depends not only upon a clear explanation expressed in terms he can understand, but also frequent and varied experiences in the use of the word.

IV. In building these basic and secondary vocabularies, constant use has been made of recognized work such as the Report of the National Committee, Document 108 of the College Board, the Syllabus of the New York State Regents, the Thorndike list, and the Horn list. These vocabularies are supplemented by lists of words which offer unnecessary difficulties to the high-school pupil and could be replaced by simple phrases. The reform can be accomplished in the near future if teachers, administrators, and makers of tests and examinations can be aroused to the necessity for simplifying the technical vocabulary of high-school geometry.

INTELLIGENCE AND SPANISH HOMES AS FACTORS IN SPANISH ACHIEVEMENT ON THE CANAL ZONE

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I. INTELLIGENCE AND SPANISH ACHIEVEMENT

DATA on the intelligence of the Canal Zone pupils taking the maximum offering of Spanish compared with those who take less than this amount are presented in Table I. It is seen at a glance that pupils with uninterrupted instruction in Spanish excel the other group in grades 9 and 11 and are but slightly below in grade 10. Apparently the better pupils are among those taking the most Spanish. In every case, too, the smaller standard deviation of the group with the most Spanish, as compared with the other, indicates more homogeneity.

TABLE I

AVERAGE APTNESS RATIOS OF CANAL ZONE ENGLISH-SPEAKING PUPILS WHO HAVE HAD UNBROKEN INSTRUCTION IN SPANISH COMPARED WITH APTNESS RATIOS OF ENGLISH-SPEAKING PUPILS WHO HAVE NOT HAD UNINTERRUPTED INSTRUCTION IN SPANISH

Pupils with Uninterrupted Instruction			
Mean Aptness Ratios*	111.79	105.0	125.77
S.D. (dis.)	27.4	25.4	27.35
Other English-speaking Pupils			
Mean Aptness Ratios	100.51	106.94	108.75
S.D. (dis.)	40.1	36.6	33.7

* The aptness ratio was determined in the following manner: Scores on two mental tests were assigned sigma scores, the scale ranging from 0.00 to 10.00, the score 5.00 being the mean of the distribution—as in McCall's T-score technique. (Each grade was treated separately.) The pupils' chronological ages were similarly treated. The aptness ratio then was determined by dividing the average sigma scores on the two mental tests by the sigma score of the chronological age. As will be seen from this table, the average aptness ratio turned out to be in excess of 1.00.

TABLE II

CORRELATION OF SCORES ON SPANISH TESTS WITH APTNESS RATIOS OF ENGLISH-SPEAKING PUPILS HAVING HAD UNINTERRUPTED INSTRUCTION IN SPANISH IN THE CANAL ZONE SCHOOLS

	Grades		
	9	10	11
Vocabulary Test:			
Correlation (Product-Moment)	$+.010 \pm .095$	$+.023 \pm .095$	$+.304 \pm .123$
Reading Test:			
Correlation (Product-Moment)	$+.335 \pm .119$	$+.131 \pm .132$	$+.495 \pm .101$
Total of Four* Spanish Tests:			
Correlation (Product-Moment)	$+.276 \pm .09$	$+.105 \pm .14$	$+.307 \pm .123$

* The four parts of the American Council Alpha-Vocabulary, Grammar, Reading and Composition.

If pupils enrolled in Spanish are learning it to the best of their ability, we should expect a high correlation between scores on the various Spanish

tests and on intelligence tests. This correlation would not be perfect for several reasons: neither the intelligence tests nor the Spanish tests measure perfectly what they purport to measure; even if the tests were perfect, special abilities in language as apart from general intelligence would lower the correlation; absence and other irregularities necessarily introduce some difference in the degree to which pupils utilize their abilities. On the other hand, a low correlation between intelligence and Spanish test results indicates that pupils are not studying Spanish as industriously as they should.

Table II shows the correlation found between Spanish test results and aptness ratios of Canal Zone high-school pupils. (For the purposes of this correlation, aptness ratios may be considered as equivalent to Intelligence Quotients.) The findings reported in Table II are disappointing, indicating as they do practically complete lack of correlation between intelligence and Spanish vocabulary in grades 9 and 10 and an insignificant correlation between reading and intelligence in grade 10. The correlation between intelligence and the composite Spanish score is also below expectations.

It is obvious that there is higher correlation between reading ability in Spanish and intelligence than between mastery of Spanish vocabulary and intelligence. It is quite possible that learning a foreign vocabulary is a special mental process not given much weight in the usual intelligence examinations.

We cannot interpret the correlations reported in Table II except by comparison with comparable correlations. The Modern Foreign Language inquiry found: "A careful examination of the evidence shows sufficiently high coefficients of correlation to indicate a positive relationship between the intelligence test results and success in the modern languages, but does not demonstrate that the scores on general intelligence can be used alone for any prognosis. The most that can be said for the intelligence test in this regard is that it forms a useful member of a battery of tests for predictive use in the admission of students to modern language study."[1]

"The study cannot, therefore, pretend to be conclusive nor to produce results which are valid for the prognosis problem without further experiment. Its value is, nevertheless, quite definite in that it contributes

[1] Fife, R. H. *A Summary of Reports on the Modern Foreign Languages.* (New York: Macmillan Company, 1931), p. 125.

concrete data showing that there is a greater parallelism of intellectual effort between Beginning English (Rhetoric) and the two other abilities examined, achievement in the foreign languages and in intelligence tests, than there is between achievement in the foreign languages and in the intelligence test.''[2]

The extensive studies of the Modern Foreign Language inquiry therefore seem to indicate that success in foreign languages has a low correlation with success in general intelligence tests. This explains to some extent the low correlations between intelligence test results and Spanish achievement of the Canal Zone pupils, but it seems that the Canal Zone correlations were lower than those found in the States.

TABLE III

CORRELATION OF APTNESS RATIOS OF CANAL ZONE NINTH GRADERS WITH THEIR SCORES ON ELEMENTARY ALGEBRA AND FRENCH TESTS*

	Elementary Algebra	Beginning French
Number of Cases	116	21.
Correlation (Product Moment)	+ .47	+ .454**
Probable Error	± .05	± .12

* The Algebra test was the Columbia Research Bureau Algebra Test 2, Form A; the French test, American Council Beta French Test, Form A. Both were given at the end of the school year.

** The case of one pupil who took this test has been omitted in computing this figure. This pupil had an aptness ratio far exceeding that of any other child in the Canal Zone high schools and made a score on the French test closely approached by only one other pupil. Being such an extreme case in a small group, this pupil's scores had an undue weight on the coefficient of correlation, the addition of her record to the computations bringing the coefficient up to .573.

A study of the relationship between intelligence quotients and teachers' marks in Spanish given 1,002 boys and girls in San Diego and Los Angeles gave correlations ranging from +.426 to +.089 for boys and from +.531 to +.114 for girls. In this study it was shown that the correlation between intelligence and success in Spanish declined with an increase in the number of semesters of Spanish studied, indicating that previous preparation in Spanish is more important than intelligence.[3] The Canal Zone findings do not bear out this theory, the correlation between intelligence and Spanish test results being highest in the group which had studied the most Spanish. This difference of findings may be due to the fact that in the California study intelligence was correlated with teachers' marks, whereas on the Canal Zone the correlation was between intelligence and objective test results.

[2] *Ibid*, page 130.

[3] Kaulfers, W. C. "The Intelligence Factor in Foreign-Language Achievement," *The School Review*, XXXIX, pp. 42-48.

Comparison of the correlation of the Spanish and intelligence test results with correlations of Canal Zone scores on Algebra and French tests with intelligence tests may be made by comparing Table II with Table III. This comparison shows higher correlations in the other subjects except for Spanish reading in grade 11.

II. SPANISH INSTRUCTION FOR PANAMANIANS

Should the Canal Zone schools offer instruction in the Spanish language to pupils whose native language is Spanish? Arguments advanced in support of an affirmative answer to this question are principally three: (1) many of the Spanish-speaking pupils entering the Canal Zone high schools never have had systematic instruction in Spanish grammar (having entered the Canal Zone or other English language schools in the lower grades) and hence are in need of such instruction to improve their Spanish; (2) instruction in Spanish, given in English, helps them to learn English; and (3) presence in the classes of Spanish-speaking pupils makes it easier to carry on Spanish conversation. Arguments against allowing Spanish-speaking pupils to enter the regular Spanish classes are: (1) Spanish-speaking pupils have at the time of their enrollment in the Canal Zone schools a better command of Spanish than English-speaking pupils will have after five years of instruction; (2) The Spanish-speaking pupils enroll in Spanish classes to get snap credits; (3) the facility of Spanish-speaking pupils in the class conversation discourages English-speaking pupils from taking part; and (4) if Spanish-speaking pupils learn English more readily when it is taught in conjunction with Spanish, special classes should be organized in which instruction in English is given in Spanish. (Some work of this nature has been done.)

The tests given the Spanish-speaking pupils throw light on some of the above arguments. These tests results are unsatisfactory evidence in some cases for two reasons: (1) the number of cases in the different grades with varying amounts of Spanish are usually too small to be reliable indications of the true average scores; and (2) as the tests used were developed to test the Spanish knowledge of English-speaking pupils, a good knowledge of English was assumed. The English ability required by the different tests is summarized as follows:

Vocabulary Test: Knowledge of English is as important as knowledge of Spanish because the equivalent of a Spanish word must be selected from five given English words.

Grammar: Ability to read the directions, which are in English, is helpful, but the actual exercises are entirely in Spanish and could be answered by anyone using good Spanish. No rules of grammar are needed, except that 8 of the 50 items require ability to link the English description of tense with the Spanish form of the verb.

Reading Test: All of the reading in this test is in Spanish, but the answers are to be written in English. The answers are short, however, often but a single word.

Composition Scale: This exercise requires the writing in Spanish of a composition about a picture. No knowledge of English is required, beyond understanding what is to be done.

To get an idea of the effect of knowledge of English on the accomplishment in the Spanish tests of Spanish-speaking pupils, the scores on two Spanish tests were correlated with scores on the Wilson Language Error test, which was given at the same time. The Wilson test is not designed to measure a foreigner's knowledge of English, but it is a rough measure of such knowledge.

The low and negative correlations of the Wilson test with the Spanish tests in grades 9 and 10 indicate that ability to do the Spanish test is not highly correlated with knowledge of English. Only in grade 11 is there any significant correlation between the tests. The pupils on which the figures for that grade are based have been in the Canal Zone schools for at least three years. Having been in an English-language school that long, they must have a good enough knowledge of English so that they were but slightly handicapped in the Spanish tests by weakness in English. Therefore, the intelligence of the pupils would have more to do with their scores on the Spanish tests than would their knowledge of English, and as intelligence also would be a large factor in success on the Wilson language test we would normally expect a positive correlation between the two.

From the figures in Table IV it appears that the Spanish-speaking pupils were not greatly handicapped in the Spanish tests by their weakness in English. (All of the Spanish-speaking pupils tested had been in English-language schools for at least seven months.)

The average scores, together with the number of pupils in each case, of the Spanish-speaking pupils who have pursued various combinations of Spanish courses are given in Table V. To facilitate studying the effect of continued pursuit of Spanish courses on the scores of Spanish-speaking pupils, the averages of Table V have been re-arranged in Table VI. Table

TABLE IV

CORRELATION OF SCORES MADE BY SPANISH-SPEAKING PUPILS IN CANAL ZONE SCHOOLS ON WILSON LANGUAGE ERROR TEST WITH SCORES ON AMERICAN COUNCIL ALPHA SPANISH VOCABULARY AND GRAMMAR TESTS

	Semesters Spanish Studied	Number of Cases	Correlations, Wilson Language with Spanish			
			Vocabulary		Grammar	
Grade 9	2	8	—.399	±.20	—.740	±.11
	4	8	+.075	±.24	—.565	±.19
	More than 4	11	+.22	±.20	—.367	±.17
Grade 10	6	6	+.041	±.26	+.074	±.26
	8	12	+.076	±.19	+.005	±.19
Grade 11	6	8	+.489	±.20	+.573	±.19
	10	7	+.122	±.25	+.294	±.24

VI indicates, too definitely for the result to be due to chance, that the mere continuation in school of Spanish-speaking pupils improves their scores on Spanish tests, due no doubt to increasing facility in English. On the other hand, it appears equally definite that the taking of additional courses of Spanish actually lowers the scores on the Spanish tests (the gains due to advance in grading being ruled out). This latter is obviously unreasonable, for even if the pupil learned nothing new in a class, taking the course could hardly reduce his knowledge. The explanation of this apparent falling off in knowledge with increased study is to be found in Table VII.

Table VII shows that there is a negative correlation between the school success of Spanish-speaking students and the amount of Spanish they study. In other words, the poor pupils collect credit by taking

TABLE V

AMERICAN COUNCIL SPANISH TEST RESULTS FOR SPANISH-SPEAKING STUDENTS CANAL ZONE SCHOOLS

Grade	Semesters of Spanish Studied	Mean Score			Mean Score		
		No. of Cases	Vocabulary Test	Grammar Test	No. of Cases	Reading Test	Composition Scale
9	2	8	73	32.4	5	27.4	9
	4	8	64.5	34.9	3	27	8.6
	5 and up	11	75.8	28	10	25.4	6.3
	Total	27	71.6	31.5	18	26.4	7.4
10	2–4	6	88	36	2	30	9.5
	6	5	85	35.8	3	25	7.6
	8	12	77	31	10	23.5	7.5
	Total	23	81.6	33.3	15	24.6	7.2
11	2	4	91	35.5	3	31	9
	6	5	95	41.2	2	32	9
	8	3	77	28			
	10	7	86.6	36.6	7	27	7.8
	Total	19	88.2	36.2	12	28.9	8.3
12	4 and up	8	89.5	36	8	31.7	9.3
9–12	None	8	75				

TABLE VI

GAINS MADE BY SPANISH-SPEAKING STUDENTS IN SCORES ON AMERICAN COUNCIL ALPHA SPANISH TEST FROM GRADE TO GRADE AND WITH INCREASED AMOUNT OF SPANISH INSTRUCTION

Semesters Spanish Studied	Excess of Gains over Losses with Advance in Grade: Actual	Excess of Gains over Losses with Advance in Grade: Possible	Mean Scores Made in Different Grades: Vocabulary Grades 9	Vocabulary 10	Vocabulary 11	Vocabulary 12	Grammar 9	Grammar 10	Grammar 11	Grammar 12	Reading 9	Reading 10	Reading 11	Reading 12	Composition 9	Composition 10	Composition 11	Composition 12
2	3	4	73		91		32		36		27		31		9		9	
3–4	3	3	65				35	36			27	30			9	10		
5-up	5	5	76	88		90	28			36	25			32	6			9
6	4	4		85	95			36	41			25	32			8	9	
8	—1	2		77	77			31	28			24				8		
10		0			82				33				25				7	
Total	14	18																
Excess of gains over losses with added study—																		
	Total																	
Actual	—11		0	—2	1		0	—2	1		—2	—2	0		—2	—2	—1	
Possible	26		2	2	3	0	2	2	3		2	2	2		2	2	2	

Note: This table is to be read thus: Row 1 shows that for those Spanish-speaking pupils who studied Spanish 2 semesters the actual number of gains in average scores from grade 9 through 12 on the 4 tests was 3 out of a possible 4, that is, in the 9th grade the average vocabulary score was 73 while the 11th grade score was 91, therefore an actual gain was made in the only case a gain was possible on the vocabulary test. In the composition test, however, the score was 9 in the 9th grade and 9 in the 11th grade, so that in this case the possible gain from the 9th to the 11th grade was not made. As there were gains in both grammar and reading as well as vocabulary, the excess of gains over losses naturally was 3.

Reading down the column for Vocabulary, grade 9, it is seen that the average score for grade 9 Spanish-speaking pupils who had studied Spanish two semesters was 73, for those who had studied it three or four semesters 65, and for those who had studied it five or more semesters 76. Thus there are two possible gains to be made from added instruction, as shown in the last figure in the column. Between 2 and 3–4 semesters of instruction there was a loss; between 3–4 and 5-up semesters of instruction there was a gain which cancelled this loss so that the excess of gains over losses for the 9th grade was zero, as shown in the second-from-the-bottom figure in the column.

TABLE VII

CORRELATION OF THE SEMESTERS OF SPANISH REGISTERED FOR BY PANAMANIAN PUPILS IN THE CANAL ZONE SCHOOLS WITH THE GRADES* EARNED IN SUBJECTS OTHER THAN SPANISH

Grade	Number of Cases	Correlation (Product Moment)
9	8	—.24 ±.22
10	7	+.029 ±.25
11	10	—.622 ±.14

*Grades were given numerical value as follows: A-4, B-3, C-2, D-1, F-0. All the pupils included in this correlation had entered the Canal Zone junior high school in grade 7 and had progressed normally since. In calculating the number of points earned, the three highest subjects other than Spanish were counted.

as many snap Spanish courses as possible, while the brighter pupils do not waste their time in Spanish courses, with the subject matter of which they already are largely familiar. It is true that the number of cases on which Table VII is based is too small to insure reliability and

TABLE VIII

COMPARISON OF MEAN SCORES ON AMERICAN COUNCIL ALPHA SPANISH TEST, CANAL ZONE ENGLISH-SPEAKING WITH SPANISH-SPEAKING PUPILS*

Test	Pupil Group	Grade 9	Grade 10	Grade 11	Perfect Score
Vocabulary	English-speaking	42	55	61	100
	Spanish-speaking	72	82	87	
Grammar	English-speaking	13	21	24	50
	Spanish-speaking	32	33	38	
Reading	English-speaking	17	21	24	36
	Spanish-speaking	26	25	28	
Composition	English-speaking	4	6	5	11
	Spanish-speaking	7	7	8	

* The English-speaking pupils whose scores are given here are those with the maximum amount of Spanish instruction up to their present grade. The Spanish-speaking pupils include all those who have had any Spanish instruction in the Canal Zone schools.

that in grade 10 the correlation is slightly positive, but the large negative correlation in grade 11 where the effect of the practice would naturally be most noticeable adds weight to the findings.

Table VIII is necessarily rather indefinite, the averages for the Spanish-speaking pupils being based on the test scores of pupils who have studied various amounts of Spanish. But the wide superiority of the Spanish-speaking pupils over those who speak English is readily apparent. Only in reading do the English-speaking pupils approach the Spanish speakers. It seems that it is in reading, rather than grammar, that the Spanish-speaking pupils need instruction in their own tongue. Table VIII shows the undesirability of teaching Spanish-speaking and English-speaking pupils in the same class. In every test but reading the Spanish pupils of grade 9 far exceed the Americans in grade 11.

SUMMARY

The better Canal Zone pupils apparently are continuing their study of Spanish into the upper grades. Any weakness in Spanish achievement is not due, then, to lack of intellectual ability on the part of the pupils.

The correlation between intelligence and Spanish scores is lower on the Canal Zone than would be expected from studies made elsewhere. It also is lower than in the cases of certain other subject matter tests given on the Canal Zone. It appears that for some reason or other Canal Zone pupils are not putting a normal amount of effort into their study of Spanish.

The Spanish-speaking students in the Canal Zone schools know enough English so that the American Council Alpha test is a good measure of their knowledge of Spanish. Spanish-speaking pupils taking considerable Spanish in the Canal Zone schools are the poorer Spanish pupils and apparently take the Spanish courses to gain easy credits; there is no indication in the present study that they learn an appreciable amount of Spanish. The Spanish-speaking students on entering the Canal Zone high schools know so much more Spanish than do the English-speaking pupils that it seems unreasonable to have the two groups in the same Spanish classes.

EDITORIAL

RESEARCH AND THE PROFESSIONAL EDUCATION OF TEACHERS

As one phase of the present social and economic readjustment, the unemployment of teachers and the new expectations of leadership from the profession has created a crisis in the professional education of teachers; and while this situation is one demanding action, it is also one demanding additional information and insight into the many factors conditioning the efficiency of teachers. Both original research and summaries of already reported researches are needed:

(1) How many new teachers per year, subject, and grade can the profession absorb? It would appear to be a very short sighted policy that would permit the training of more teachers than the profession can absorb. This, inasmuch and so long as teachers trained in one state may be employed in other states, is a national problem.* (2) What is the present status of the unemployment of teachers? There are many facts—facts that may throw light upon the incidence of unemployment—that one would like to have about these teachers, such as their age, sex, personal appearance, health, cultural status, personal idiosyncracies, intelligence, subject combinations, the kinds and amounts of training, the kinds and amounts of experience, etc. Are there any particular types of individuals as to age, sex, training, and experience that are more generally unemployed than others? (3) How many of the present unemployed teachers are bona fide teachers legally certified to teach and previously employed in the profession? It has been said that the ranks of unemployed teachers have been greatly augmented by unemployed doctors, lawyers, ministers, and engineers. (4) How many of the present unemployed teachers are physically, socially, and emotionally qualified to teach? One gets the impression that a considerable number of these teachers should never have been graduated or possibly even admitted to teacher-training institutions. Many teacher-training institutions have

* "Teacher Demand and Supply," *Research Bulletin of the National Education Association*, IX, November, 1931.

sensed their responsibility in this matter and have introduced the principle of selective entrance. This practice suggests another question. (5) What are the physical, intellectual, social, and emotional qualities prerequisite to teaching success? Some teacher-training institutions have instituted selective programs employing grades, and tests of personality, health, and intelligence as the selective agents. This is a matter about which it would be difficult to exercise too much care. Selective devices chosen from general or incidental observation may be grossly inaccurate. Turning now to the training of teachers one recalls yet other questions. (6) What subject combinations are teachers most frequently called upon to teach? Recognizing that due regard must be given by administrative officials to the special equipment of teachers in their placement, on the other hand, many teachers probably have not been trained with the practical situation of the schools in mind. (7) How much training should a teacher have? While it is true that there are many unemployed teachers, it appears that there are many teachers both employed and unemployed who have far less training than one should have for the successful discharge of the responsibilities of a teacher. The profession needs more information about this subject. There appears, also, to be great sectional differences and urban-rural differences in this respect that need investigation. (8) Recognizing that teachers are expected to exercise a certain amount of social and civic leadership, how well qualified is the average teacher, employed and unemployed, for this responsibility? There is little doubt that the country is passing through a social and economic revolution. We need to know what teacher-training institutions are doing to meet this emergency; we also need to define the teacher-training institution's responsibility with reference to it. (9) What are the objectives of teacher-training, that is, what are the characteristics (knowledges, skills, habits, attitudes, and interests) of the ideal teachers? This is not a new question, but there is yet plenty to be learned about it. (10) How can these qualities be most efficiently inculcated in the teaching profession? Some critics of the present program for the professional education of teachers assert that the professional courses consume valuable time with small returns in added teaching efficiency. Professional educators have been free to advise others as to how to organize curricula and institute new methods of procedure. To what extent have they applied these theories to the professional education of teachers for which they themselves are responsible? In part, the problem is one of better methods of teaching, involving such questions as: What are the relative merits of

practice, observation, and verbal instruction in learning to teach? How can the learning process be better motivated? How may individual differences be more adequately recognized? What are the mental processes involved in learning to teach? What are the conditions prerequisite to economical learning? What are the kinds of difficulties most frequently experienced by student teachers? Etc. In spite of the many investigations of how pupils learn in the elementary and secondary schools, relatively few investigations have been made of how teachers learn to teach, the instruction of teachers in teacher-training institutions continuing very much in its original mold of required courses in education, observation, and practice. Closely related to these problems of method are the many problems of curriculum. (11) What kinds of curricula produce the most efficient teachers at the different age, grade, and subject levels? There is a considerable amount of uncontrolled trial and error in this field but little controlled experimentation. (12) How do teachers trained in different sorts of teacher-training institutions succeed as teachers? What are their characteristic weaknesses? Their positional history? Etc. (13) Assuming that the institutional training of teachers will need to be continued in service, how can the in-service training of teachers be made more effective? How may the specific training needs of in-service teachers be most effectively determined? How may the instruction of teachers in service be made more effective? And, finally, (14) how can teaching ability be more effectively measured? The measurement of teaching ability is important in selecting teachers for training, in evaluating the product at the end of the training period, in evaluating teachers in service, and in the experimental study of training of teachers.

There are many aspects of the professional education of teachers, such as those enumerated above, about which those entrusted with the administration of teacher education need more information. The *Journal of Educational Research* will be pleased to publish both original researches and summaries of researches in this field.

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REVIEWS

Address all communications relative to book reviews to Editor Kai Jensen, University of Wisconsin, Madison, Wisconsin.

LEE, DORIS MAY. *The Importance of Reading for Achieving in Grades Four, Five, and Six.* Contributions to Education, No. 556 (New York: Bureau of Publications, Teachers College, Columbia University, 1933), pp. viii + 64.

Educational psychologists have taken it as a matter of course that a child must have a good reading ability to be able to progress in other subjects in school. This view is based in part upon observation of large numbers of cases of dyslexia demanding remedial treatment in reading between the ages of nine and twelve. This book states the results of an investigation of the relationship between reading ability and achievement and presents some statistical evidence of a positive correlation.

Two hundred and four children in the fourth, fifth and sixth grades were divided into four I.Q. levels. Achievement differences were calculated in terms of number of months difference between achievement age and mental age. The sigma scores (called achievement indices) for each I.Q. level for the distribution of achieving differences were used as a basis for computing correlations with reading ability.

The author found the highest correlation between reading test scores and achieving indices in the fourth grade, lower correlations in the fifth grade and almost negligible correlations in the sixth grade. The correlation between reading scores and mental age was higher for the sixth grade than for the fourth.

One of the important educational implications of the study is that remedial reading is of extreme importance in the second and third grades.

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SHIPLEY, GERTRUDE TYSON. *An Evaluation of Guided Study and Small-Group Discussion in a Normal School.* Contributions to Education, No. 486 (New York: Bureau of Publications, Teachers College, Columbia University, 1932), pp. vii + 52.

This is an addition to the literature of experimentation with methods of teaching and learning in higher education. The author provides in Chapter I a resumé of selected and relevant material from former studies by Hudelson, Tuttle, Morris, Bane, and others. The problem investigated was: "Will the use of small group-study discussion periods during one or two hours of a three-hour a week course in principles of education reduce the required extra-class study appreciably, yield any concomitants of value, and yet enable the students concerned to achieve as good results, measured by objective tests, as if all three class periods had been given to class discussion and all the assigned reading had been done outside the class period?" The subjects were 383 senior students in the Maxwell Training School for Teachers, New York. They

were distributed among 13 sections, seven sections during the first half and six sections during the second half of 1929-1930.

The method used is the two group method using control and experimental groups, the small group-study sections being considered the experimental group. The basal learning material was that in Gates, *Elementary Principles of Education*. The tests were made by the author and were objective in character. To equate groups, the author used weighted indices of chronological age, Otis intelligence scores, student-teaching scores, personality ratings, and freshman scholarship averages. The teaching procedure is described for both control and experimental groups and involves numerous variable factors. To discover reliability of results, the author used McGaughy's critical ratio technique which is

$$\text{Critical Ratio} = \frac{M_1 - M_2}{P.E._{\text{Diff. of Means}}}$$

By this device, the reliability was shown doubtful in approximately 50 percent of the cases (11 out of 21 for Otis test, 12 out of 21 for C.A., 12 out of 21 for P.T. grade, 9 out of 21 for personality ratings, and 7 out of 21 for freshman averages). In making final comparison of status of two groups (control and experimental), the critical ratio technique is again used. The conclusion of the experiment is: "The experimental group did as well as the control group . . . and the data tend to favor slightly the experimental method."

In addition to the experiment, the author secured subjective, unsigned judgments of the values of the two methods from the students themselves. Of these judgments, 58 percent favored the experimental method, 10 percent were against, and 30 percent favored and gave suggested improvements. To this the author added her own views, 12 in number. The volume includes a brief bibliography.

Perhaps the most valuable material for teachers is the group of comments made by the students and the author.

The writer of this review notes a few matters for comment. First, if the experimenter desired to secure groups with identical (or similar) learning capacity why did she not devise and use simple *learning* experiments rather than the results of tests and school grades. At best, such ratings are indices of achievements and only indirectly indices of capacity. But a change in learning per unit of time *may* be a far better index of what the learner *can* do. If so, may we not have many so-called identical groups which are really spurious? In other words, may not *rate of change* be a better index of learning and status than *constancy* which is so frequently used? One may note also a curious reversal of value in the weighting assigned to practice teaching scores. For purpose of equation it is given the lowest rank of five factors. On the other hand, the majority of studies for prognostic values have found that the practice teaching status is one of high value.

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WELLES, HENRY HUNTER. *The Measurement of Certain Aspects of Personality Among Hard of Hearing Adults.* Contributions to Education, No. 545 (New York: Bureau of Publications, Teachers College, Columbia University, 1932), pp. viii + 77.

Generally, one is apt to become depressed by description and study of the deaf or the hard of hearing as they euphemistically are called. The quality of Mr. Welles' report of his investigation

commands an appreciation that keeps one from becoming depressed emotionally by a study of the emotional life of the hard of hearing. Mr. Welles' investigation was recommended by the National Research Council and was sponsored by Professor Pintner. It probably is the first extensive study that has been made of the personality problems of the hard of hearing with the aid of an objective measuring instrument. The Bernreuter Personality Inventory was used to evaluate some of the personality difficulties of the deaf. By the selection of judicious quotations from many sources, and by their classification, Welles sets forth expert opinion on the personality problems of the hard of hearing.

In the second chapter, the possibility of measuring the personality of the hard of hearing is discussed. The reader will find in this chapter a brief and critical discussion of some of the instruments which have been used to measure certain characteristics of personality. In any study of adults the major problem is to secure an adequate number of adults who will coöperate with the investigator. Through the coöperation of Hard of Hearing Leagues in New York City, contacts were made with many hard of hearing persons. Controls were obtained by asking each hard of hearing subject to submit the name of a friend who was comparable for age, education, and socio-economic status. A personality inventory was mailed to each subject, experimental and control, accompanied by a letter which aimed to instruct and motivate the subjects. The scores of the hard of hearing were compared with the scores of their control groups to discover whatever similarities or differences existed in their scores of emotionality, introversion-extroversion, dominance-submission and of self-sufficiency. The author summarizes a portion of his findings by saying: "Thus the relatively unselected group of hard of hearing men and women from various leagues for the hard of hearing scored significantly more emotional, more introverted, and less dominant as a group than their hearing friends, though there was a large overlapping of individual scores between the groups. Significant differences were not found on the measure of self-sufficiency."

A specially selected group of hard of hearing was also studied. The members of this group were selected because they had been exceptionally successful in overcoming their special difficulties. A part of the author's conclusions as they pertain to this group is as follows: "The special group, selected for their ability in having successfully surmounted their hearing handicap, did not differ significantly as a group from their hearing friends on any of these measures." The author devotes several pages to arranging the items of the Bernreuter Inventory according to the degree that the hard of hearing differ from the hearing. Mr. Welles asked judges to indicate the items to which they thought the responses of the hard of hearing were governed by their sensory defect. There was relatively little agreement among the judges. The author states: "It is further concluded that a classification of significantly different items for the hard of hearing was not possible on this measure in terms of the influence of the sensory defect divorced from their factors."

Correlations were worked out between scores of emotionality and numbers of years deafened, ages at loss of hearing, hearing in best ear, differences between ears in hearing, and hours of lip reading training. The correlations are low and unconvincing.

The reader will find Mr. Welles' study one which adds to our understanding of the personalities of hard of hearing adults. The study was carefully executed and it was excellently reported. The reviewer, however, experienced at times when he studied Mr. Welles' report a transfer of attention from the sense of hearing to the sense of sight. As a consequence he expresses the wish that the Columbia University Contributions to Education appear in larger type.

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GROTE, CAROLINE. *Housing and Living Conditions of Women Students in the Western Illinois State Teachers College at Macomb: School years 1926-1927, 1927-1928, and 1928-1929.* Contributions to Education, No. 507 (New York: Bureau of Publications, Teachers College, Columbia University, 1932), pp. vii + 106.

The general character of this investigation is described in the following quotation from the jacket of the book: "This is an intensive experimental study of specific aspects of housing, which supplements or supplants mere expression of opinion. It presents the evolving aspects of housing and the influence of a woman's dormitory. Differences in academic achievement, health, and social experiences under the various housing conditions are measured, and the reliability of the measures used is tested. Statistical significance of data is presented."

As the background for her study the author gives a survey of previous investigations of college housing, which leads to the conclusion that there is need of intensive experimental studies of specific aspects of housing to supplement the general opinions expressed in the literature. Although it is a problem in which many factors are involved and in which it is difficult to make a controlled experiment, it is evident that an attempt is justified. It is in line with the tendency in modern education to extend the use of the scientific method whenever possible into all fields of human activity in order to make more certain our body of available information.

Before starting her experimental work, Dr. Grote sent out a questionnaire to Deans of Women in State Teachers Colleges, the purpose of which was to ascertain whether scientific studies had been made of any of the factors relating to housing. The replies indicated that while there was an interest in such investigations, there was at the same time an evident lack of them.

For the purposes of this study, the 894 freshman women who continued in school during any given year of the three years studied, were grouped according to their residence as follows:

I. Those who lived in the college dormitory (Monroe Hall)
II. Those who lived in their own homes in the college town
III. Those who lived at home but not in the college town
IV. Those who roomed and boarded in boarding houses
V. Those who roomed in rooming houses but ate elsewhere
VI. Those who did light housekeeping
VII. Those who worked for their board and room with families or in boarding houses.

The data were obtained by questionnaires, by interviews and conferences, by observation and by visits, and from college and high school records. The specific measurements used were as follows:

1. Scholastic achievement was measured by the honor point system. Closely related factors were considered to be (a) the native intelligence as measured by the Otis Self Administering Test and the Pressey Senior Classification Test, (b) the high school marks which were reduced to a percent basis, and (c) the hours of study per week which were secured by asking the students to keep a time schedule for a week in November.

2. Health achievement was measured in two ways: (a) by Dr. Thomas D. Wood's 1925 Health Rating Scale (Appendix B) which was used early in the fall and late in the spring of each year, and (b) by the number of days absence from regular class periods or from some regular activity as checked in the office of the Dean of Women when the student called for her excuse.

3. Social Achievement was measured by a social participation scale (Appendix D) which included also the factor of weights or points for a given activity. One very excellent feature of this scale is that it includes among extra-curricular activities that of work of any kind toward self-support.

When the residence groups are taken as a basis of consideration, it is seen that, (a) Groups IV and V have steadily diminished while Group VI has increased in number of cases from year to year; the gain in health during each year was always greater for Group I; (c) the highest average of day's absence for illness was found in Groups II and III (at home); (d) the highest score for social participation was always found in Group I.

Probably the most significant differences found when the measures were tested for reliability are those that point to the fact that the light-housekeepers and the self-supporting group did not compare favorably with the other groups; academic achievement was greater, first, for those who lived in their own homes and second, for those who lived in the dormitory; and finally, health promotion and social achievement was greater for those who lived in the dormitory.

This useful book has made at least two important contributions: it demonstrates that a strictly objective study can be made successfully of such personal factors as are here considered; and it calls our attention to the fact that while we may need to recognize the tendency of the student to turn more and more to less expensive forms of living while in college, such as working for room and board and doing light-housekeeping, we must also bear in mind that certain achievement factors may be influenced seriously thereby.

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SMITHIES, ELSIE M. *Case Studies of Normal Adolescent Girls.* (New York: D. Appleton and Company, 1933), pp. ix + 284.

The conception of "pedagogical case work" presented by Miss Smithies should be useful to school principals and counsellors who desire to bring to their work the aims and methods of modern psychology and sociology, but should probably be supplemented by other discussions of case work technique which represent somewhat different approaches. There is likely to be some disagreement, from many professional social workers, with the general discussion of techniques given in the first chapter and illustrated in the case reports composing the next twelve chapters. Psychologists will approve the choice of tests and interpretations of test results in these cases, for the most part.

It is to be regretted that Miss Smithies has not answered certain questions that will naturally occur to the professional persons who read her book. It appears from some of her case reports that joint interviews with a girl and her mother sometimes take place. Miss Smithies does not state what effect such joint interviews have on the girl's relationship with the case worker nor does she discuss the techniques of handling such joint interviews in a manner which will not interfere with the rapport between the girl and the case worker which she rightly stresses as essential if the personal interviews with the former are to be of value. Again, we are not told how the girl reacts to the worker's obtaining extensive information about her from parents and teachers or just how this is discussed with her in the personal interviews. From our own clinical experience, it would seem that the girl might have some feeling about this matter, which might affect the rapport with the worker. No doubt, Miss Smithies has recognized these problems of case work and has developed techniques for meeting them. It is unfortunate that she has not gone into them more fully for the benefit of less experienced workers who may wish to follow the methods outlined in her book.

In reading the case studies, one suspects that Miss Smithies has more adequate understanding of physical and environmental factors than of emotional ones in her allotment of "primary" and "secondary" causations of student problems. There is an attempt to include the emotional factors but when we find statements such as that on page 78, where the loss of a father apparently is equated with the loss of a more distant relative in the respective instances, we begin to question the soundness of interpretation. Theoretically, we surely may assume that the loss of a father would be a far more traumatic experience for a girl than any other personal loss. The remedial measures seem to be directed toward helping the girls with educational adjustments and changing their environment rather than toward the working through of emotional conflicts. Perhaps case work in the school situation must necessarily be limited to the former ends, since a considerable amount of time and highly specialized training would be required for carrying on remedial work with the individual for the latter purpose.

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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

AYER, FRED C. *The Progress of Pupils in the State of Texas, 1932-1933.* Research Bulletin of the Section of Superintendence (Austin, Texas: Texas State Teachers Association, 1933), 36 pp.

This bulletin presents the results of a study of pupil progress in the state of Texas, initiated two years ago. After presenting a summary of the first report upon this subject, made in November, 1932, the bulletin discusses the general method of collecting data; the general age-grade-progress status of Texas pupils; the relation of entrance age to pupil progress; the size of city, semi-annual promotion, and racial conditions; with conclusions and recommendations.

BEATTY, T. B., AND OTHERS. *Cumulative Pupil Personnel Records:* Elementary and Secondary Schools, Bulletin 81 (Harrisburg, Pennsylvania: Department of Public Instruction, 1933), 23 pp.

This bulletin contains the report of the Pennsylvania Committee on Records and Reports appointed by the Department of Public Instruction of the state of Pennsylvania. The report contains such matters as the value of cumulative personnel records, general description of the cumulative record form, suggestions for collecting and organizing data for cumulative record form, installation of the cumulative personnel record system, directions for making entries on the secondary school cumulative record card, directions for making entries on the elementary school cumulative record card, and supplementary record forms.

GAMPERT, RACHEL. *La Situation de la Femme Mariee dans l'enseignement* (The position of the married woman in teaching), Publications du Bureau International d'Education, No. 29 (Geneve, France: Bureau International d'Education, 1933), 86 pp.

This bulletin presents a summary of legislation and practice effecting married women in a number of countries the world over.

GREENWOOD, WALTER B. *A Study of Persistence of Public Evening High School Students.* Doctor's Dissertation (Philadelphia, Pennsylvania: University of Pennsylvania, 1932), 231 pp.

This bulletin contains a statement of the problem; the method, materials and personnel employed in this investigation; the questionnaire and its construction; relationship between absence and elimination; study of 3813 public evening high school students; intelligence and persistence; a check on the reliability of the information given; reasons for elimination from the public evening school;

summary and conclusions; and observations. Bibliography.

HAGMAN, ELIZABETH PLEGER. *The Companionships of Preschool Children*, University of Iowa Studies in Child Welfare, New Series No. 255 (Iowa City, Iowa: University of Iowa, 1933), 67 pp.

After presenting a statement of the aims of the present investigation, the author presents a summary of previous investigations, development of a method for measuring the frequency of companionship, relation of certain similarities to frequency of companionship in the group situation, relation of amount of association inside and outside of school to frequency of companionship in school, age and sex differences, experimental situations, individual differences, and summary of conclusions. Bibliography.

HAWKINS, MASON ALBERT. *Frederick Douglass High School*—A Seventeen-Year Period Survey. Doctor's Dissertation (Philadelphia, Pennsylvania: University of Pennsylvania, 1933), xxix + 203 pp.

This bulletin presents a seventeen-year study of the Frederick Douglass High School, discussing the history of this high school; the school population; features of management; curriculum; curriculum practices; promotions, non-promotions and subject successes and failures; occupations of parents and graduates, occupational choice of pupils; and summary of conclusions.

HENNINGER, MARIE J. *An Evaluation of Extra-Curricular Activities in the Pittsburgh Public Schools*, Pittsburgh Schools Bulletin, VIII, No. 1 (Pittsburgh, Pennsylvania: Board of Education, 1933), 38 pp.

The author presents a comprehensive survey of extra-curricular activities in the Pittsburgh schools, listing the activities and presenting the results of a questionnaire addressed to 1500 junior and senior high school pupils, to 336 teachers and 150 alumni.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

CLEM, ORLIE M., AND CALHOON, A. R. "Organizing Junior High Schools to Meet Individual Differences," *Educational Administration and Supervision*, XIX (November, 1933), pp. 571-577.

The author presents the results of a questionnaire study to which 77 New York state junior high school principals replied, discussing entrance requirements, routine organization, curriculum, homogenous grouping, articulation, guidance, extra-curricular activities, and physical education.

DEPUTY, E. C. AND REED, RUTH. "How Do Training School Pupils Succeed in the Junior High School? *Educational Administration and Supervision*, XIX (November, 1933), pp. 607-612.

After summarizing previous investigations the author presents the results of a study of the training school pupils of the San Diego State Teachers College in which he finds two statistically significant differences between training school and non-training school groups.

FARLEY, EUGENE S., AND OTHERS. "Factors Related to the Grade Progress of Pupils," *Elementary School Journal*, XXXIV (November, 1933), pp. 186-193.

From a study of 193 twelve-year-old pupils enrolled in grades IV-VIII in the Newark, New Jersey, public schools, the authors find a definite relation between the grade progress of pupils in ability and achievement. They also found that a number of pupils who were not correctly graded in achievement and ability were considered the proper basis for grade placement. No significant relationship was found between grade placement and health or socio-economic status.

FREDERICK, ORIE I. "Practices Distinctive of Comprehensively Organized Secondary Schools," *School Review*, XLI (December, 1933), pp. 768-779.

This article describes the development and content of two standardized check lists for the organization of junior and senior high schools.

LITHAUER, DONAH B. "A Follow-Up Report of the Later School Progress of Children of Primary School Age Trained in an Experimental Kindergarten," *Journal of Juvenile Research*, XVII (July-October, 1933), pp. 175-178.

From an analysis of 25 individual case studies of children in a Hebrew orphan asylum, New York City, the author concludes that the kindergarten is valuable in the school system for the prevention of failures.

POWELL, MAGGIE A. "Section Achievement Comparison," *Educational Research Bulletin*, XII (November, 1933), pp. 239-243.

A study of the achievement of homogeneous groups in the Kennard Junior High School, Cleveland, Ohio, formed on the basis of the I.Q. and the probable learning rate.

STRANG, RUTH. "Developments in Student Personnel Research," *Teachers College Record*, XXXV (November, 1933), pp. 120-134.

A summary of research relating to student personnel in which the author discusses guidance and factors conditioning scholastic success in college.

WAMPLER, RICHARD LEE. "Personal Adjustment of Prospective Teachers," *Educational Administration and Supervision*, XIX (November, 1933), pp. 597-606.

The author discusses the vocational adjustment, opportunities for taking responsibility, leadership and fellowship experiences, contacts with children and the cultural interests of teachers' college students. The author finds that the experiences of teachers' college students are limited in these fields.

EXPERIMENTAL STUDIES OF LEARNING AND TEACHING

ALMACK, JOHN C., AND STAFFELBACH, E. H. "Method in Teaching Spelling," *Elementary School Journal*, XXXIV (November, 1933), pp. 175-185.

The authors present a review of previous investigations with the conclusion that systematic method in teaching spelling adds greatly to results. Bibliography.

BAIL, PHILLIP M. "A Critical Analysis of Pupil Responses to the Concepts of Mechanics in High School Physics," *Science Education*, XVII (December, 1933), pp. 321-329.

From a study of 895 exercises in mechanics the author finds an inadequate mastery of the concepts of this subject and recommends improved teaching procedures.

CLEM, ORLIE M., AND DUDLESTON, JOSEPH J. "Factors Influencing the Common Science Knowledge of High School Pupils," *Science Education*, XVII (December, 1933), pp. 267-272.

From a study of 1070 pupils in the Utica Free Academy of Utica, New York, the author concludes that a pupil's knowledge of science increases with the amount of science passed, with age, with pupils enrolled in the scientific curriculum, with pupils enrolled in science clubs, and other factors.

EURICH, ALVIN C. "The Photographic Eye-Movement Records of Successful and Unsuccessful College Students," *Journal of Applied Psychology*, XVII (October, 1933), pp. 604-613.

From a study of 49 probation students and an equal number of non-probation students, when matched for sex, major subject, and intelligence, the author finds that the successful students obtain higher scores in reading comprehension and spend slightly less time in fixational pauses than probation students.

MCKINNEY, F. "Quantitative and Qualitative Essential Elements of Transfer," *Journal of Experimental Psychology*, XVI (December, 1933), pp. 854-864.

An experimental study in which the author finds that, among other things, the percentage of transfer increases with the amount of alteration in the geometry figures employed in the investigation but not proportionally to the alteration.

MILLER, EMANUEL. "Temperamental Differences in the Behavior Disorders of Children," *British Journal of Educational Psychology*, III (November, 1933), pp. 222-236.

From a study of some 113 cases referred to a child guidance clinic the author finds the following reaction types: the mobile—impulsive-sociable, frustrating rebellious type; the atomic—low impulsive, a social psychoneurotic child; the subjective type—low mobility, given to sudden impulsive outbursts, but not given so much to rebelliousness as to bad temper, alternating with psychoneurotic reactions.

ROSS, C. C. "The Influence upon Achievement of a Knowledge of Progress," *Journal of Educational Psychology*, XXIV (November, 1933), pp. 609-619.

From a study of a group of 83 students enrolled in a measurement class at the University of Kentucky, the author concludes that a knowledge of progress, such as is afforded by students seeing their test papers or hearing their test scores, need not be a factor in the ordinary classroom situation in college.

WOLNER, MANUEL AND PYLE, W. H. "An Experiment in Individual Training of Pitch-deficient Children," *Journal of Educational Psychology*, XXIV (November, 1933), pp. 602-608.

The authors report the results of a study wherein seven of the pitch-deficient pupils found in three Detroit elementary schools by three months of training in which the piano, tuning forks, and vocal exercises were used, were trained to distinguish pitch and to sing. Bibliography.

CURRICULUM RESEARCH

CLARK, C. C. "The Talking Movie and Students' Interests," *Science Education*, XVII (December, 1933), pp. 312-320.

From a study of some 600 college

freshmen the author finds the talking movie to have superior interest value.

HOLLAND, MARY N. "Extra-Curriculum Activities in High Schools and Intermediate Schools in Detroit," *School Review*, XLI (December, 1933), pp. 759-767.

A survey of extra-curriculum activities in the Detroit junior and senior high schools based upon questionnaires addressed to the 19 high schools and the 20 intermediate schools of that city.

LITHERLAND, H. "Evaluating Teacher-training Curricula," *Educational Administration and Supervision*, XIX (November, 1933), pp. 627-633.

The author presents a summary of investigations relating to the evaluation of teacher-training curricula. There is a definite need for the elimination of undesirable duplication; and the establishment of a degree of uniformity in course content is recommended.

CHILD WELFARE, GUIDANCE AND DEVELOPMENT

BURNS, C. L. C. "Child Guidance on the Continent," *British Journal of Educational Psychology*, III (November, 1933), pp. 251-268.

A survey of guidance practices in continental countries: Italy, Switzerland, Vienna, Germany, Austria, Holland, and Belgium.

WALLACE, RAMONA. "An Interest Inventory for Use in the Child Guidance Clinic," *Journal of Juvenile Research*, XVII (July-October, 1933), pp. 147-152.

The author presents an interest inventory developed in collaboration with the staff of the California Bureau of Juvenile Research.

WILLIAMS, HERBERT D. "A Survey of Pre-Delinquent Children in Ten Middle Western States," *Journal of Juvenile Research*, XVII (July-October, 1933), pp. 163-174.

This survey covers 55,995 children attending the schools of Bloomington, Decatur, Elgin, Jacksonville, Peoria, Rock Island, in Illinois; South Bend, Terre Haute, Vincennes, in Indiana; and Racine, Wisconsin. Of this total 1,343 or 2.4 percent were listed as pre-delinquent. This compares with 2.6 percent in a similar survey made in 1931.

MEASUREMENTS, STATISTICS AND METHODOLOGY OF EDUCATIONAL RESEARCH

BROTEMARKLE, R. A. "What the Bernreuter Personality Inventory Does Not Measure," *Journal of Applied Psychology*, XVII (October, 1933), pp. 559-563.

The author reports the intercorrelations between the Bernreuter Personality Inventory and the Thurstone Neurotic Inventory, the Bernreuter Self-sufficiency Test, the Laird C2 Introversion Test, and the Allport Ascendance-Submission Reaction Study, and found the correlations to be uniformly low.

CUFF, NOEL B. "Relationship of Socio-Economic Status to Intelligence and Achievement," *Peabody Journal of Education*, XI (November, 1933), pp. 106-110.

From a study of 758 college freshmen, the author finds a tendency for those in the higher socio-economic percentiles to score higher on intelligence tests and to make higher college grades.

McCLUSKY, HOWARD Y. "An Experimental Comparison of the New Type Test and the Term Paper," *Journal of Applied Psychology*, XVII (October, 1933), pp. 621-627.

From an experimental study of 42 experimental and 38 control subjects the author finds certain advantages in favor of the term paper.

PETERS, CHARLES C., AND VAN VOORHIS, W. R. "A New Proof and Corrected Formulae for the Standard Error of a Mean and of a Standard Deviation," *Journal of Educational Psychology*, XXIV (November, 1933), pp. 620-633.

From a different approach to the standard error of a mean and of a standard deviation, the authors offer new proof and new formulae for these values.

RULON, PHILLIP J., AND CROON, CHARLOTTE W. "A Procedure for Balancing Parallel Groups," *Journal of Educational Psychology*, XXIV (November, 1933), pp. 585-590.

The authors explain, with appropriate formulae, a procedure for matching groups when the matching of means and variability is made for the groups as a whole.

MISCELLANEOUS

FRITZ, RALPH A. "Predicting College Marks and Teaching Success for Students in a Teachers College," *Techne*, XVII (November-December, 1933), pp. 21-23.

From a study of intelligence, aptitude, age, teaching experience, occupation of parents, and high-school records, the author concludes that the psychological examination and aptitude test were the only two instruments that appeared to have value in predicting college success. The psychological examination gave a correlation of .73 with the aptitude test.

PERRIN, ETHEL. "Health Education Bibliography Junior and Senior High School," *School Science and Mathematics*, XXXIII (December, 1933), pp. 998-1002.

An annotated bibliography of publications relating to health education in the junior and senior high schools.

PETERS, CHARLES C., AND OTHERS "The Penn State Experiments in Character Education," *Journal of Educational Sociology*, VII (December, 1933), pp. 213-272.

A report of a number of investigations dealing with the subject of character education as follows: "The reliability and validity of estimates (ratings) as measuring," James C. Swab and Charles C. Peters; "Can social leadership be improved by instruction in its technique?" George A. Eichler and Robert R. Merrill; "The effect of direct instruction," E. K. Robb and J. F. Faust; "The Effect of the study of Latin upon Character traits," Elizabeth B. Meek; "Teaching international-mindedness in the social studies," Don W. Campbell and G. F. Stover; "The teaching of courtesy in the junior high school," Alice K. Milson; "Workbook method or oral discussion?" Elmer W. Cressman; "Plane geometry and character education," Grace E. Allen; "The results of the incidental method of instruction in character education," F. R. Kniss, E. K. Robb, and E. A. Glatfelter; "The effect of athletics on certain character studies," J. L. Hackenberg, E. B. Yeich and L. A. Weisenfluh; and "Summary of the Penn State experiments on the influence

of instruction in character education," Charles C. Peters.

PINSENT, ARTHUR. "Pre-College Teaching Experience and Other Factors in the Teaching Success of University Students" *British Journal of Educational Psychology*, III (November, 1933), pp. 201-221.

From a study of the records of 398 men and 362 women the author concludes that the evidence suggests that given a minimum of intelligence and academic ability, success in teaching is most strongly determined by qualities of personality, character, and temperament.

PINTNER, RUDOLF, AND FORLANO, GEORGE. "The Influence of Month of Birth on Intelligence Quotients," *Journal of Educational Psychology*, XXIV (November, 1933), pp. 561-584.

From a tabulation of 17,502 I.Q.'s according to the month of birth the authors find a consistently lower mean I.Q. for the winter months than for other months. Ranking the months according to mean I.Q., sunshine, and temperature, the authors find correlations of +.59 for sunshine and +.67 for temperature. The authors explain the low winter I.Q.'s on the basis that these months are those of the highest death rate and that those children born in winter who survive are more likely to be impaired.

SCATES, DOUGLAS. "Locating the Median of the Population of the United States," *Metron*, XI (July, 1933), pp. 49-61.

The author discusses the different methods employed in determining the center of population with the appropriate statistical procedures for locating the median of a large population distributed over a plane.

SKEWES, GEORGE J. "What is a Scientific Attitude?" *School Science and Mathematics*, XXXIII (December, 1933), pp. 964-968.

The author presents a summary of the results from a questionnaire study of the varied elements included in the scientific attitude.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

DOCTORS' THESES UNDER WAY IN EDUCATION, 1933-1934*

CARTER V. GOOD
University of Cincinnati

THIS, the fourth annual list of Doctors' theses under way in education, should be of interest to graduate students, professors of education, and others engaged in educational research, by way of indicating centers of activity and preventing unnecessary duplication of effort, and even make possible a measure of integration and coördination in graduate research work in education.

In the instances where full information was given by the graduate institution, the name of the candidate, title of the thesis, graduate school, and major adviser have been listed. No differentiation is made between Ph.D. and Ed.D. titles. The institutions which have forwarded titles this year are: Boston, California, Catholic University, Chicago, Cincinnati, Colorado, Colorado State Teachers College, Columbia, Cornell, George Washington, Harvard, Illinois, Indiana, Iowa, Johns Hopkins, Kansas, Michigan, Missouri, New York, Northwestern, Ohio, Oregon, Peabody, Pennsylvania, Pennsylvania State College, Pittsburgh, Southern California, Stanford, Temple, Texas, Washington, West Virginia, Wisconsin, and Yale.

Titles previously listed in 1933, 1932, or 1931 are not reported this year, unless an old problem has been revamped, or discarded and a new one chosen by the candidate. For present purposes the title forwarded by the institution has been the basis for such deductions. Workers interested in Doctors' studies completed in education may find such in the annual bibliography of educational research published by the United States Office of Education, which also includes Masters' titles. It is an obvious deduction that titles listed in the January numbers, 1933, 1932, and 1931, of the *Journal of Educational Research* represent completed studies, are still in progress, or have been discontinued.

NEW 1933-34 LIST

1. Afros, Jacob L. "An Experimental Observational Study of the Methods of the Young Circle League." New York. Radosavljevich.
2. Akridge, Garth H. "Chronological Age as a Basis of Pupil Placement." Columbia. Strayer.
3. Alves, H. F. "A Study of Teaching Personnel in the State of Texas." Texas. Ayer.

* E. R. Miller, graduate student at the University of Cincinnati, has been of material assistance in the rather laborious work of checking the titles forwarded by the institutions against the lists of previous years and in compiling the new titles not previously reported.

4. Anderson, Almar S. "Community Conflicts in Relation to Superintendents of Schools." New York. Thrasher.
5. Anderson, O. A. "An Experimental Study of the Relative Merits of the Lecture and Problem Methods in University Teaching." Stanford.
6. Andrews, Bonnie. "The Factor of Authority in Determining of Curricula and Courses of Study of Secondary Schools." California. Williams.
7. Anibal, Earle W. "The Financial Administration of Organized Campus Activities in Publicly Supported Teachers Colleges and Normal Schools." Columbia. Evenden.
8. Arnold, Dwight. "Adolescent Day Dreams." Ohio State. Goddard.
9. Arnold, Ruth Johnson. "Learning Involved in the Ability to Write Certain Chemical Equations." Columbia. Powers.
10. Atkinson, Arthur M. "Critical Analysis of Research Procedures in the Fields of Administration, Measurement, Higher Education, and History of Education." Pittsburgh. Buckner.
11. Austin, John Green. "Is the County Superintendency a Blind Alley Job?" Peabody. Frost.
12. Axtell, Paul H. "Judicial Determinations Affecting the Power to Create or Alter School Districts in the United States." New York. Meredith.
13. Baird, Gladys. "The Development of Public Schools for the Education of Spanish-Speaking Children in Texas." Peabody. Crabb.
14. Baker, Kenneth H. "Distractors of Attention and Some Compensating Factors." Ohio State. Dockeray.
15. Bakst, Aaron. "A Course in Mathematical Physics for the Senior Year of High School." Columbia. Reeve.
16. Baldwin, Clare C. "The Administration of Substitute Teaching Service." Columbia. Elsbree.
17. Ball, Irving. "Centralized Controls of State Institutions of Higher Learning in the United States." Texas. Pittinger.
18. Barden, Earl K. "The Elimination of Pupils in the Public Schools of the State of Texas." Texas. Ayer.
19. Barnard, Laurence W. "A History of Theological Education in the Baptist Denomination in the United States of America." New York. Creager.
20. Baumann, Sister M. Zena. "A Basic Curriculum for Training Teachers for Catholic Rural Schools." Catholic University of America. Johnson.
21. Bean, Mary V. "The Modifying Influences of the Social, Industrial, Economic Order on Higher Education as It Has Produced Graduate Instruction." Ohio State. Klein.
22. Beers, H. W. "Preliminary Attempt at Measuring Intelligence of Farm Men and Women through Use of Questions of Fact." Cornell. Sanderson.
23. Bernstein, Irving D. "Parallel Movements Advancing the Psychotherapy of the Functional Mental Disorders." New York. Benson.
24. Besig, Emma M. S. "A Historical Study of English Composition." Cornell. Jordan.

25. Beau, Frank A. "Administration of the Normal Schools and Teachers Colleges in the Territory of the North Central Association." Chicago.
26. Bigelow, Roy G. "A Study of the Activities of State High School Supervisors." Peabody. Knudsen.
27. Bond, Horace M. "Social and Economic Influences on Education of Negroes in Alabama from 1865 to 1930." Chicago.
28. Bonney, Merl. "Methods of Influencing Human Behavior, with Applications to Education." Columbia. T. Alexander.
29. Booker, Ivan A. "The Measurement of Achievement in Silent Reading at the College Level." Chicago.
30. Borasa, Harold. "An Experimental Study of the Rate of Writing and the Legibility of Certain Letter Forms." Chicago.
31. Boyington, Gladys. "Teaching of History in the Secondary Schools of Germany." Columbia. Johnson.
32. Boynton, J. B. "A Study of the Age-Grade Distribution of Pupils in Texas." Texas. Ayer.
33. Brandt, Hyman. "Steps vs. Time in the 'Spread' of Rewards." Columbia. Thorndike.
34. Bratcher, E. E. "A Comparison of Resident and Non-Resident Teachers in Village and Small City School Systems of Kentucky." Chicago.
35. Brenner, Benjamin. "The Effect of Immediate and Delayed Praise or Blame upon Learning and Recall." Columbia. Pintner.
36. Bridge, Edna B. "Objective Evidence of Children's Concepts in Science." Columbia. Powers.
37. Briscoe, Alonzo M. "The Local Administrative Unit." Columbia. Mort.
38. Brock, John D. "A Study of Certain Psychological Traits as Related to Accomplishments in College." New York. Lloyd.
39. Broderick, Sister M. John. "Catholic Education in Argentina." Catholic University of America. Jordan.
40. Brooks, Glynn A. "The Justification of Universal Secondary Education." Colorado.
41. Brown, H. Emmett. "The Understanding of Certain Numerical Relationships in High School Physics Possessed by Students." Columbia. Powers.
42. Brown, Harold. "A History of the Public Common School System of Nevada." California. Swift.
43. Brown, Hubert E. "Safety in Elementary Schools." New York. Lloyd.
44. Brown, Jean Fleming. "A Fused Course in Demonstrative Plane and Solid Geometry for the Tenth Year." New York. Drushel.
45. Brunschwig, Lily. "The Study of Some Aspects of Behavior Adjustment in Deaf Children by Questionnaire Methods." Columbia. Pintner.
46. Bryan, Roy C. "Pupil Rating of Secondary-School Teachers." Columbia. Symonds.
47. Buck, Walter. "Comparative Measurement of Interest and Emotion Traits in College Students over a Period of Ten Years." Ohio State. S. L. Pressey.
48. Burckel, Christian E. "An Experiment in Organization for Adult Education." Columbia. Brunner.
49. Buckley, Harold B. "Problems of

Teachers in Business Education." Temple.

50. Burkhardt, A. P. "The Economic Aspects of the Norfolk Junior College in Relation to the Community of Norfolk, Nebraska." Colorado State Teachers College. Frasier.

51. Buros, Oscar K. "The Ability of States to Support Education." Columbia. Engelhardt.

52. Burr, S. E. "A Study of a School's Transition to the Activity Plan." Cincinnati. Streitz.

53. Burton, Henrietta K. "Home Living Conditions and a Craft Revival: A Study in Extension Education." Columbia. Andrews.

54. Cahoon, Guybert. "The Effectiveness of Certain Criteria in Estimating the Success of Student Teachers." California. Rice.

55. Cameron, W. J. "Equivalent Patterns of Olfactory and Gustatory Stimuli in the Feeding Reactions of Newborn Infants." Ohio State. Dockeray.

56. Campbell, John E. "Catholic Education in a Democracy." Catholic University of America. Jordan.

57. Campbell, Raymond G. "State Control of Budgetary Procedure in City School Systems." Columbia. Engelhardt.

58. Canary, Peyton Henry. "The Scriptural Teachings of the World's Religions on International Understanding and Goodwill." Indiana.

59. Carbaugh, Gaile A. "Principles Affecting the Reconstruction of the Secondary-School Curricula." Ohio State. Alberty.

60. Carrier, Blanche. "Education for Parenthood and Family Life in American Protestantism." Columbia. Case.

61. Chadderdon, Hester. "Evaluating the Achievement of Students in Home Management." Ohio State. Tyler.

62. Chamberlain, Robert S. "Essentials of Mental Hygiene in Modern Homiletical Literature." New York. Hamilton.

63. Chambers, Maude L. "The Relation of the Space Arts to the Social Studies in the Preparation of Teachers of These Subjects in the Junior High School." Columbia. Bagley.

64. Cheney, Ray E. "The Use of Specifications in the Purchase of Classroom Equipment for High Schools." Columbia. Engelhardt.

65. Clark, Felton G. "The Control of State-Supported Teacher-Training Programs for Negroes." Columbia. Evenden.

66. Cline, William Rodney. "The Educational Achievements of Seaman A. Knapp." Peabody. Crabb.

67. Corbett, James F. "The Consumer and the School." New York. Gill.

68. Covello, Leonard. "The Social Backgrounds of the Italian School Child." New York. Thrasher.

69. Craven, C. R. "A Counseling Program for Boys in the Secondary School." Colorado State Teachers College. Mahan.

70. Cressman, E. W. "The Moral Concepts and Judgments of Junior High School Pupils." Pennsylvania State.

71. Crownover, Emma. "Quintilian's Use of the Previous Educational Writings." Peabody. Little.

72. Cummings, Milton C. "A Case Study of Social Factors Involved

in the Mobilization of Community Sentiment for the Support of School Bond Issues." Yale.

73. Cunningham, Isabelle H. "Visual Aids, Their Use and Value in Teaching Geography." New York. Dearborn.
74. Dale, W. S. "Education and Culture Contacts in Maori, New Zealand." Yale.
75. Dalrymple, Charles O. "A Survey of the Uses of Fractions in Business and Life." Boston. Wilson.
76. Daniel, Walter G. "Economic Problems of Negro College Students." Columbia. Bagley.
77. Darling, Elmer C. "Curricular Trends in Higher Education in Iowa Since 1900." Iowa. Packer.
78. Davids, Robert. "The Underlying Theory of Negro Education in Maryland." Hopkins. Bamberger.
79. Davis, Benjamin F. "An Inquiry on Certain Aspects of Learning Shorthand." Columbia. Spence.
80. Davis, Donald. "Temporary Loans in School Finance." Pittsburgh. Rohrbach.
81. Davis, Norma Jessie. "The Effects of Acid- and Base-Forming Diets on the Calcium, Phosphorus, and Nitrogen Metabolism of Children." New York. West.
82. Davis, William. "An Investigation Into the Financing of Catholic Schools," Catholic University of America. Johnson.
83. Dean, Dawson F. "Significant Characteristics of the Homosexual Personality." New York. Zorbaugh.
84. DeMay, Amy J. "A Study of the Comparative Value of Two Methods of Teaching Fractions, the Drill Method and the Rationalizing Method, with Special Consideration of Which Method Results in the Greater Retention." New York. Drushel.
85. Dilla, Geraldine Princess. "Bibliography and Critique of Mutual Criticism between France and England between the Fashoda Incident and 1914." Peabody. Roehm.
86. DeNapoli, Peter John. "Is Homework Justifiable in the Elementary Schools?" Columbia. McGaughy.
87. Dobbs, Alma A. "A Study of Pupil Health Interests." Columbia. Symonds.
88. Dome, Arthur E. "The Establishment of Objectives of Physical Education in the Young Men's Christian Association." New York. Lloyd.
89. Donovan, J. J. "Litigation Arising Out of Religious Issues in the Public Schools." Pittsburgh. Rohrbach.
90. Dorgan, Ethel J. "The Biography of Luther Halsey Gulick." Columbia. Williams.
91. Dowell, Anita S. "The Physical Efficiency of White Elementary Teachers in Baltimore City During 1924-1930." Hopkins. Bamberger.
92. Doxsee, E. D. "A Procedure of Determining Junior College Needs for a City's School District." California. Lee.
93. DuBois, Rachel Davis. "The Relative Efficacy of the High-School Assembly Versus the Classroom Period for Developing Tolerant Attitudes of Pupils." Columbia. Kulp.
94. Duck, W. O. "Optimum Size of Secondary Schools in Respect to Cost." Pittsburgh. Rohrbach.

95. Duggan, Anne S. "A Comparison of the Physical Education Major and the Non-Major in Certain Personal Traits." Columbia. Williams.

96. Dunahoo, Henry Asbery. "The Social Composition of Negro Secondary-School Pupils of the South." Peabody. Roemer.

97. Dunathan, Homer R. "History of Findlay College. Ohio State. Klein.

98. Duncan, Leonard. "An Investigation of Pupils' Aims, Their Methods of Study, and the Outcomes of Their Study of High-School Literature." Pittsburgh. Buckner.

99. Dunlop, Florence S. "A Follow-up Study of Pupils Who Have Left Special Classes for Subnormal Children in Ottawa, Canada." Columbia. L. S. Hollingworth.

100. Dyess, W. Ben. "An Evaluation of Courses in General Methods of Secondary Teaching." New York. Suhrie.

101. Edwards, Frances R. "Teaching Children about the Church." Columbia. Case.

102. Ehrenfeld, Abraham. "The Manneheim System." New York. Radosavljevich.

103. Eichler, G. A. "Studies in Student Leadership: Controlled Experiment in the Teaching of Leadership with a Quantitative Analysis of the Components of Leadership." Pennsylvania State.

104. Elliott, Grace L. "An Inquiry into the Psychological Problems of the Life of Women between 35 and 50." Columbia. Johnson.

105. Emick, Glenn Oscar. "Cooperative Training in Merchandising and Retail Selling in the Public Secondary Schools of the United States." Indiana.

106. Engeleman, Finis E. "Comparative Effectiveness of Conversational Style and Narrative-Expository Style in Fifth and Sixth Grade Reading Materials." Yale.

107. Enlow, E. R. "A Special Statistical Slide Rule." Peabody. Cooke.

108. Evans, C. M. "Survey of Negro Education in Missouri." Ohio State. Davis.

109. Fausold, Samuel. "The Achievement of Pupils in Large and Small Classes." Pittsburgh. Rohrbach.

110. Finley, George W. "Mathematics for Junior High School Teachers." Columbia. Reeve.

111. Fisher, Mildred. "A Study of the Differences between Problem and Non-Problem Children in the Elementary and Secondary Schools of South Orange and Maplewood." New York. Zorbaugh.

112. Fitzgerald, Nugent E. "Building the Agricultural Subject Matter Part of the Curriculum for the Training of Teachers of Vocational Agriculture for the High Schools of Tennessee." Ohio State. Charters.

113. Floto, W. H. "The Practical Application of the Educational Philosophy of John Dewey." Pittsburgh. Harris.

114. Floyd, L. P. "Changes in the Teaching of Chemistry in High Schools, Teacher-Training Institutions, and Liberal-Arts Colleges." Chicago.

115. Foster, Clark L. "Exposition and Criticism of the Doctrine of Basedow." Ohio State. Good.

116. Ford, Gertrude C. "Curriculum Determination in Vocational Typewriting." Ohio State. Stone.
117. Forman, William O. "Procedures to Reveal Released Creative Power among Pupils of the Junior High School." New York. Long.
118. Fox, John. "Recreation and Community Organization in a Commuting Community." New York. Thrasher.
119. Frederickson, Clark. "A Descriptive Study of a Local Boys' Club in New York City." New York. Thrasher.
120. French, William M. "A History of State Supported Institutions for Training Teachers in New York." Yale.
121. Fuller, Carlos G. "Why Men Leave the Ministry." Columbia. Swift.
122. Gemmill, Anne M. "The Science Background Necessary for the Professional Training of the Elementary Teacher." Columbia. Powers.
123. Gibson, Thomas R. "The Selection of the Procedures for Course of Study Construction in Health and Physical Education in Public Schools." Columbia. Williams.
124. Giesecke, Minnie. "A Developmental Study of Handedness." Chicago.
125. Gilland, T. M. "The Development of the Powers and Duties of the City School Superintendent." Chicago.
126. Gillson, Margery Stewart. "Objectives of Instruction in Chemistry for High-School Girls." Columbia. Powers.
127. Glazer, B. B. "Jewish-Christian Relationships in the United States." Pittsburgh. Franklin.
128. Godson, William F. H. "Fifty Years in the History of West Point." Temple.
129. Goldstein, Rose. "An Inductive Study of the Causes of Truancy in a Public School." New York. Radosavljevich.
130. Goltry, Thomas Keith. "An Analysis of the Oral Compositions of Certain Elementary-School Children." Iowa. Greene.
131. Gracey, F. M. "A History of School Architecture in America." Boston. Davis.
132. Gregory, Leslie R. "The Measurement of State Educational Reporting." Columbia. Engelhardt.
133. Griffey, Carl H. "Twenty Years of Progress in School Business Administration as Reflected in the Work of National Organizations." Columbia. Engelhardt.
134. Gruen, Ferdinand. "English Grammar in the American Secondary School Since 1900." Catholic University of America. McCormick.
135. Gumm, B. L. "An Analysis of Decisions Concerning the Non-Criminal Punishment of School Directors." Pittsburgh. Rohrbach.
136. Habis-Reutinger, Alice. "Needs and Possibilities of More Adequate Training Courses for Prospective High-School Teachers of French." California. Williams.
137. Hagemann, Mark. "Value of the Predictive Index for Various Coefficients of Correlation at Various Sigma Distances from the Central Tendency." Temple.
138. Hall, J. A. "Direct Contacts of the School with Patrons." Colorado State Teachers College. Whitney.
139. Hall, Lawrence K. "The Induc-

tion Experiences of College Graduates Entering the Secretaryship of the Y. M. C. A." Columbia. Elliott.

140. Hall, Milton R. "A Study of Retarded Readers in the Junior High School." Hopkins. Franklin.

141. Hamlet, Iona Cuyler. "Eye-Voice-Span in Oval Column Addition." Indiana.

142. Hankwitz, Anita. "An Approach to the Teaching of Harmony in American Colleges and Universities According to Modern Educational Needs." Columbia. Dykema.

143. Hansen, Lorenz. "A History of the American Academy 1780-1821." Boston. Davis.

144. Harper, Albert F. "A Critical Study of Existing Methods in Character Evaluation." Washington.

145. Harper, Thomas B. "A Psychological Educational Study of Individual Pupils and Groups in a New Jersey School Population." New York. Benson.

146. Harrison, G. L. "A Negro Land Grant College Program for the Improvement of Negro Education in the State of Texas." Ohio State. Klein.

147. Hartley, Byron W. "Economic Change and Its Effect Upon Educational Opportunity." Columbia. Strayer.

148. Hartung, Helene. "Educational Philosophy of Paul Natarp." New York. Horne.

149. Haught, D. L. "The Supply and Demand of Teachers in the Teachers College Areas of West Virginia." Pittsburgh. Rohrbach.

150. Hay, Homer. "Litigation Arising Out of the Creation, Alteration, and Dissolution of School Districts." Pittsburgh. Rohrbach.

151. Haynes, Hubert C. "Factors Influencing the Questioning Activities of Teachers." Peabody. Frost.

152. Hellmich, Eugene W. "Mathematics in the Social Sciences." Columbia. Reeve.

153. Herr, W. A. "The Effects of Acceleration upon the Achievement and Personality of Junior High School Pupils." Pennsylvania State.

154. Hertz, Rudolf. "An Educational Program for the Dakota Indians." Columbia. Brunner.

155. Hester, Kathleen. "Testing Some Aspects of Scientific Thinking. Pittsburgh. Gould.

156. Hiatt, L. R. "Ability of Children in the Elementary Grades to Orient Themselves." Chicago.

157. Hill, George E. "Factors Associated with Delinquency among Boys with Especial Emphasis on Educational Background." Northwestern. Betts.

158. Hill, Guy H. "An Appraisal of North Carolina's Provision for Furnishing Teachers for Her White Secondary Schools." Michigan. Schorling.

159. Hindman, D. A. "A Teacher-Training Curriculum in Physical Education." Ohio State. Charters.

160. Hobson, Cloy. "Educational Facilities in Different Types of School Districts in Illinois." Chicago.

161. Hoffman, Moses N. H. "The Measurement of Bilingual Background." Columbia. Pintner.

162. Holbrook, Harold. "A Study of the Educational Background or

Patients with Mental Disorders." Yale.

163. Holley, J. Andrew. "An Experiment in Problem Solving in Economics." Columbia. Symonds.

164. Holmes, Frances B. "An Experimental Study of the Fears of Young Children." Columbia. Jersild.

165. Holmes, Lulu H. "The Development of the Position of the Dean of Women in Certain Selected Coeducational Colleges and Universities." Columbia. Sturtevant.

166. Holt, Andrew D. "Statutory Provisions for Certification of Teachers." Columbia. Elsbree.

167. Hooper, Laura. "A Critical Evaluation of a Program of Education with Supervision the Integrating Factor." Yale.

168. Hopkins, John L. "A Program for the Development of More Adequate Secondary Education in Westchester County." New York. Meredith.

169. Horton, Clark W. "A Comprehensive Examination for Graduate Students in Botany." Ohio State. Tyler.

170. Hulse, M. L. "A Study of Teaching Rating as Applied to Practice Teachers." Cornell. Ogden.

171. Humke, Homer Louis. "Counselling the College Student." Indiana.

172. Humphries. J. A. "The College of the University of Chicago in Relation to Trends in Higher Education." Chicago.

173. Huntington, H. A. "Related Mathematics and Science for Woodworking Industries." Ohio State. Warner.

174. Huston, Hazel. "A Comprehensive Program of Examinations in High-School Home Economics." Ohio State. Tyler.

175. Igo, H. J. "Arithmetic Difficulties Involved in the Study of Algebra." Colorado State Teachers College. Wrinkle.

176. Isidro, Antonio. "A Critical Evaluation of English Compositions Written by Filipino Children in Grades III to VII." Chicago.

177. Iverson, W. L. "U. S. Military-Post Schools 1821-1932." Stanford.

178. Jaarsma, Cornelius. "Educational Philosophy of Herman Bavinck, Dutch Theologian-Philosopher-Educator." New York. Horne.

179. Jacob, Walter, Jr. "Practical School Economics in a City of Thirty Thousand." New York. Dearborn.

180. Jacobsen, E. A. "Educational Program in Utah." California. Peterson.

181. Jaffe, Philip. "An Evaluation of the New York City Course of Study and Syllabus in Arithmetic of 1929." New York. Speer.

182. James, May Hall. "Chronicles of Old Lyme, Connecticut, with Special Reference to the Development of Public Education." Yale.

183. Janney, Elliott J. "A Study of Emotional Maturity as Related to Leadership and to Delinquency." Ohio State. S. L. Pressey.

184. Jones, Lloyd M. "A Study of the Degree of Specificity in Some Neuro-Muscular Skills among College Freshmen Men." Columbia. Williams.

185. Jordan, Wm. C. "A History of Bowling Green State College. Ohio State. Klein.

186. Keck, Esther. "Prescriptive Pronunciation in Composition Texts,

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187. Kenney, Ralph B. "A History of Classical Study in the Schools of the United States, 1890-1925." Yale.

188. Kerchner, Emil L. "The Constancy of Vocational Choice of High-School Boys." Northwestern. Witty.

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192. Kirschner, Gale. "Construction of a Diagnostic Test in Elementary Educational Statistics." Pittsburgh.

193. Klein, Adolph. "The Experimental School of Leonard Nelson: Its Theoretical and Practical Foundation—An Exposition and Evaluation." New York. Radosavljevich.

194. Knott, W. Widnell D. "Financing and Managing the Schools of British Columbia." Columbia. Engelhardt.

195. Koonsman, G. L. "Factors in the Selection of the Superintendent of Schools." Colorado State Teachers College. Troxel.

196. Koonz, Joseph A. "Social Studies in the Curriculum of Catholic Schools." Catholic University of America. Johnson.

197. Lacy, Helen Maude. "Bibliography and Critique of English Translations from French Poetry." Peabody. Roehm.

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ments in Teachers Colleges: Their Organization and Administration." Indiana.

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Not Maintaining High Schools." Columbia. Strayer.

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of Pupil Admission." Pittsburgh. Rohrbach.

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the College Graduate Group." Indiana.

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of Certain Factors in High-School Elimination." Peabody. Roemer.

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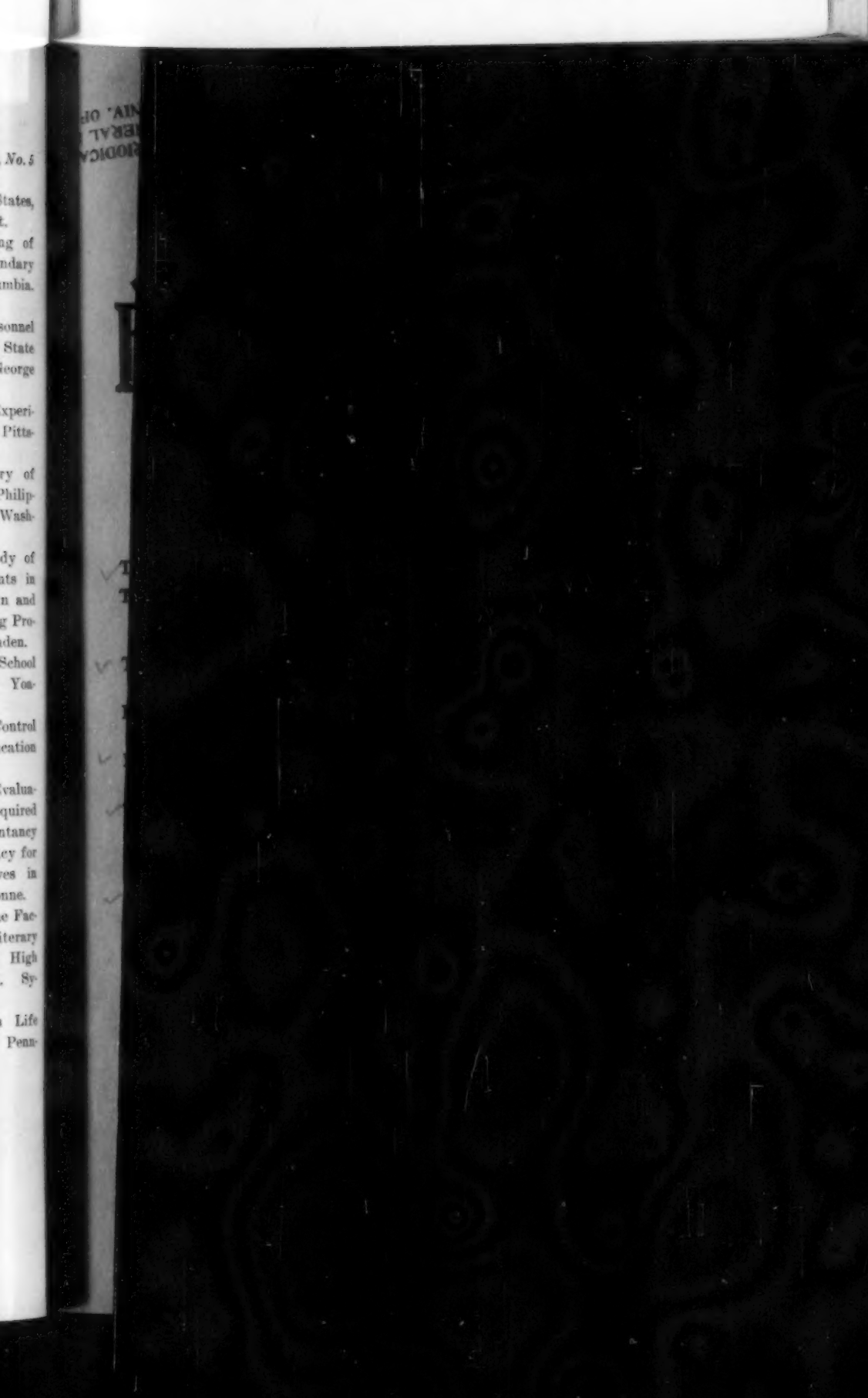
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